



Výzkumný Ústav Železniční, a.s. (Railway Research Institute, Inc.)

Notified body No. 1714

Accredited body No. AO 258

Accredited Certification Authority for products No. 3149

Accredited testing laboratory No. 1462

Certificate holder ČSN EN ISO 9001:2000

# CERTIFICATE

## of type examination

Certificate number: 1714/1/B/2007/ENE/EN/ 002

In accordance with Council Directive No. 96/48/ES of 23 July 1996 on the Trans-European high-speed railway system interoperability, as amended by European Parliament and Council Directive No. 2004/50/ES of 29 April 2004

Interoperability component:

**OVERHEAD CONTACT LINE type "S"**

Applicant and producer:

**ELEKTRIZACE ŽELEZNIC PRAHA a.s.**

Based at Praha 4, Nusle, nám. Hrdinů 1693/4a, ZIP Code 140 00  
Czech Republic

Was judged by the notified body

**Výzkumný Ústav Železniční, a.s.**

Based Praha 4 – Braník, Novodvorská 1698, ZIP Code 142 01  
Czech Republic

**The interoperability component was found to be compliant.**

The type examination was accomplished in accordance with module B in accordance with TSI HS subsystem "Energy" accepted on account of the Directive.

This certificate is valid until 30 April 2010 for the OVERHEAD CONTACT LINE type "S" designed for the single-phase traction system 1 AC 25 kV 50Hz.

The project and operation parameters, list of technical documentation and list of standards applied are given in the Appendix to the Certificate.

Date of issue of the Certificate: 30th April 2007

Identification number of the notified body: 1714

Ing. Antonín Blažek  
head manager

Výzkumný Ústav Železniční, a.s.







## Enclosure to Type Examination Certificate

No. 1714/1/B/2007/ENE/EN/ 002

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**Czech Republic**

### Description of the Reviewed Component:

The type documentation of the energy subsystem interoperability component called: OVERHEAD CONTACT LINE type "S", designed for the single-phase traction system 1 AC 25 kV 50Hz was subject to the type examination.

The submitted type model configuration of the traction line includes, besides the overhead contact line type proposal, as a crucial component for the ENE subsystem also the design of such parts as traction line, which do not fall under the conformity assessment with technical requirements for interoperability. The configuration is designed so that it enables the use of common projection parts and the interoperable trolley-line construction in several versions, i.e. for different velocity ratings, which is the basic classification parameter of the European railway system.

The velocity rating of 260km/h, with which the overhead contact line version "J<sub>260</sub>" complies, classifies it as a the high-speed track, the version "J<sub>200</sub>" fully complies with the modernized tracks for a velocity rating of 200 km/h in accordance with TSI HS ENE, directive 96/48/ES, directive 2004/50/ES and ČSN EN 50367. By choosing suitably sized parts of this component of the ENE subsystem and by choosing the optimal adjustment of its variable parameters the material unit configuration allows the creation of an optimal configuration in accordance with the specific technical requirements of interoperability for the particular track in question, designed in accordance with this configuration type of traction line.

The traction line parameters enable the use of the component under review – overhead contact line in the traction line "J" type configuration designed for the single-phase traction system 1 AC 25 kV 50Hz using newly-built or modernized tracks of the European railway system in the high-speed track variation with the velocity rating of 260km/h and for modernized tracks up to 200km/h.

**Date of issue: 30.04.2007**

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# Enclosure to Type Examination Certificate

## No. 1714/1/B/2007/ENE/EN/ 002


### Interoperability component: OVERHEAD CONTACT LINE type "S"

**Applicant and producer:**  
**ELEKTRIZACE ŽELEZNIC PRAHA a.s.**  
**Based Praha 4, Nusle, nám. Hrdinů 1693/4a, ZIP Code 140 00**  
**Czech Republic**

#### List of project and functional parameters:

Type configuration of overhead contact line "S"			
		Regulation - Standard	Note
<b>Basic parameters of type configuration</b>			
Supply voltage of overhead contact line	25 kV	TSI ENE 4.1.1. Tab.4.1 / Encl.N - N.1 ČSN EN 50163 4.1 Tab.1 / Encl.A	Extreme values are in listed standards
Frequency	50 Hz	TSI ENE 4.1.1. Tab.4.1 / Encl.N - N.2 ČSN EN 50163 4.2 / Encl.A	Extreme values are in listed standards
Maximum line speed	260 km/h + 10% 200 km/h + 10%	TSI ENE 1.3.c ČSN EN 50367 Tab.1	Line categories (I-II) according to the speed in agreement with TSI HS ENE
<b>Geometry of overhead contact line</b>			
Desing of overhead contact line	full compensated vertical overhead contact line	TSI ENE 5.3.1.1. ČSN EN 50119 Art.5 - 6 / Encl.A ČSN EN 50367 Art.5	Documentation EŽ Appendices of application No.1,2,3,4
Nominal height of contact wire [mm]	AC 4 5080 až 5300 AC 2-3 5000 až 5500	TSI ENE 4.1.2.1. Tab.4.2 / Encl.H ČSN EN 50367, Art.5, Tab.2	Documentation EŽ Appendix of application No.3
Limit values height of contact wire [mm]	AC 4 4950 - 5300 AC 2-3 4900 - 6000	TSI ENE 4.1.2.1. Tab.4.2 / Encl.H ČSN EN 50367, Art.5, Tab.2	Documentation EŽ Appendix of application No.3
Gradient of contact wire	200 km/h - 2 ‰ 250 km/h - 1 ‰ above 250 km/h - 0 ‰	TSI ENE 4.1.2.1. Tab.4.2 / Encl.H ČSN EN 50119 5.2.8.2 Tab.8	according to the desing line speed
Change of gradient of contact wire	200 km/h - 1 ‰ 250 km/h - 0,5 ‰ above 250 km/h - 0 ‰	ČSN EN 50119 5.2.8.2 Tab.8	according to the desing line speed
Permissible lateral deflection of the contact wire under the action of cross wind [mm]	400	TSI ENE 4.1.2.1. Tab.4.2 / Encl.H ČSN EN 50367, Art.5, Tab.2	
Cross-section of main line's contact wire	100 to 120mm <sup>2</sup> Cu	ČSN EN 50149	by the project efficiency and the line's speed
Tension force of main line's contact wire	10 000 to 15 000N	ČSN EN 50119	by the project efficiency and the line's speed
<b>Dynamic behavior of contact wires and quality of current collection</b>			
Mechanical wave propagation speed	111 - 120 ms <sup>-1</sup>	TSI ENE 5.3.1.4. ČSN EN 50 119 5.2.1.5 UIC 799	Documentation EŽ Appendix of application No.3
Elasticity and uniformity of contact line	fulfills the standard's requirements	TSI ENE 5.3.1.5. Tab.5.1 ČSN EN 50 119 5.2.1.4 UIC 799	Documentation EŽ Appendix of application No.3
Current capacity	fulfills the standard's requirements	TSI ENE 5.3.1.2. ČSN EN 50 119 5.1.2, 5.2.9	by the project line's efficiency
Current at standstill (max.)	80 A	TSI ENE 5.3.1.8. ČSN EN 50367 7.1 Tab.5	
Static contact force of pantographs	70 N	TSI ENE 5.3.2.6. ČSN EN 50119 ČSN EN 50367 7.1	
Mean contact force of pantographs	fulfills the standard's requirements	TSI ENE 5.3.1.6. Pic. 5.2 ČSN EN 50119 5.2.1.2 ČSN EN 50367 7.2	according to the desing line speed

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### List of EŽ technical documentation:

1. Request for examination of the type component TV of 3 January 2007 with the appendices specified
2. Enclosure 1a: Conceptual plan, production drawings and construction parts scheme
3. Enclosure 1b: Descriptions and glossary needed to understand the drawings and schemes listed and how the product functions
4. Enclosure 2: Manual for operating and servicing traction line configurations "J" and "S"
5. Enclosure 3a: Static and dynamic parameters of the traction system "„J<sub>200</sub>" and "J<sub>260</sub>" for the single-phase traction system 1 AC 25 kV 50Hz
6. Enclosure 4: TUCD protocol of the practicality test of traction line and type documentation approval protocols of partial components of traction line.
7. Enclosure 6: Parameters of traction line
8. Enclosure 8: Stroke measurement of TV "J230"
9. Enclosure 10: Computer simulations of the interference collector – traction mains

### List of standards and regulations used in the examination:

TSI of the "Energy" subsystem - appendix to Commission Decision 2002/733/ES of 30 May 2002

ČSN EN 50119: 2002 Railway facilities – Fixed traction facilities – Electrical traction over ground overhead contact line

ČSN EN 50122-1:2000 Railway facilities – Fixed traction facilities – Part 1: Protective measures related to electrical safety and grounding

ČSN EN 50149 : 2001 Railway facilities – Fixed traction facilities – Electrical traction – Profiled trolley conductor made from copper and copper alloys

ČSN EN 50163 : 2005 Railway facilities – Supply voltage of the traction systems

ČSN EN 50317 : 2005 Railway facilities – Current take-off systems – Requirements for measuring the dynamic interaction between pantograph collector and over-ground overhead contact line and checking these measurements

ČSN EN 50367 : 2006 Railway facilities – Current collector systems – Technical standards for interaction between pantograph and over-ground overhead contact line (to achieve free access)

ČSN EN 50388: 2006 Railway facilities – Power supply and railway vehicles – Technical criteria for coordination between power supply (power station) and railway vehicles for attaining interoperability

UIC-Kodex 799 :2001 Parameters for over-ground circuits with AC-Supply for tracks on which the speed exceeds 200km/h

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