



SLOVENSKI STANDARD
oSIST prEN 15686:2007

01-september-2007

Številka projekta: SIST prEN 15686:2007
Naslov: Železniška vozila na splošno - Dinamični testi za sprejem vozil s sistemom za kompenzacijo pomanjkanja prekošne višine in/ali vozil namenjenih za delovanje s prekošno pomanjkanjem prekošne višine
Ključne besede: železniška vozila, dinamični testi, sprejem, kompenzacija pomanjkanja prekošne višine, prekošna pomanjkanja višine

Railway applications - Testing for the acceptance of running characteristics of railway vehicles with cant deficiency compensation system and/or vehicles intended to operate with higher cant deficiency than stated in EN 14363:2005, Annex G

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Bahnanwendungen - Fahrtechnische Prüfung für die fahrtechnische Zulassung mit Kompensation für Überhöhungsfehlbetrag und/oder um mit höherem Fehlbetrag als in EN 14363:2005, Anhang G zu fahren

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Applications ferroviaires - Essais en vue de l'homologation du comportement dynamique des véhicules ferroviaires avec système de compensation pour les insuffisances de dévers et/ou les véhicules conçus pour fonctionner avec des insuffisances de dévers supérieures a celles énoncées dans l'EN 14363:2005, Annexe G

Ta slovenski standard je istoveten z: prEN 15686

ICS:

45.060.01 Železniška vozila na splošno Railway rolling stock in general

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May 2007

ICS 45.060.01

English Version

Railway applications - Testing for the acceptance of running characteristics of railway vehicles with cant deficiency compensation system and/or vehicles intended to operate with higher cant deficiency than stated in EN 14363:2005, Annex G

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If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Foreword

This document (prEN 15686:2007) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directives.

For relationship with EU Directive(s), see informative Annex ZA and ZB, which are an integral part of this document.

- Council Directive 96/48/EC of 23 July 1996 on the Interoperability of the trans-European high-speed rail system, as amended by Directive 2004/50/EC ¹⁾
- Directive 2001/16/EC of the European Parliament and of the Council of 19 March 2001 on the interoperability of the trans-European conventional rail system, as amended by Directive 2004/50/EC ²⁾

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1) Official Journal of the European Communities No L 235/6 of 17.09.96

2) Official Journal of the European Communities No L 110 of 20.04.2001

Introduction

This document covers the on-track testing for acceptance of the running characteristics of railway vehicles equipped with a cant deficiency compensation system and/or vehicles intended to operate with a higher cant deficiency than stated in EN 14363:2005, Annex G. It was established by Working Group 10 Vehicle/Track Interaction of CEN Technical Committee 256 Railway Applications as a supplement to EN 14363, which is related to the acceptance of railway vehicles with conventional curve speeds. It is foreseen to implement the regulations of this standard in a revision of EN 14363.

The establishment of this document was based on existing rules, practices and procedures. The following principles were applied:

- 1) The railway system requires comprehensive technical rules in order to ensure an acceptable interaction of vehicle and track.
- 2) Due to the numerous national and international regulations new railway vehicles had to be tested and homologated before putting them into service. In addition, existing acceptance had to be checked when operating conditions were extended.
- 3) In view of the increasing significance of international traffic, in particular of high speed traffic, the standardization of existing regulations is required. In some cases, additional rules are required as well. An update of existing regulations is also needed due to the considerable progress achieved in the field of railway-specific methods for measuring, evaluation and data processing.
- 4) It is of particular importance that the existing level of safety and reliability is not compromised even when changes in design and operating practices are demanded, e.g. by the introduction of higher speeds, higher wheel forces, etc.

This document takes account of the present state of the art which is generally applicable for test procedures and the evaluation of 'on-track' tests.

This document is derived in essential parts from UIC 518-1 which has not yet been fully validated by experience.

The Working Group is aware that the combination of the test conditions is not always achievable. In some cases, the existing regulations may require exceptions for which justification will be provided to the acceptance body. In this event, the conditions which are not fulfilled will be identified.

The Working Group expects that existing shortcomings will be recognized in further investigations and during frequent application of the rules.

1 Scope

This document regulates the on-track testing for acceptance of the running characteristics of railway vehicles equipped with a cant deficiency compensation system and/or vehicles intended to operate with a higher cant deficiency than stated in EN 14363:2005, Annex G.

In most cases the procedure is the same as defined in EN 14363, only the differences for the special case are listed.

The testing of the running characteristics applies principally to all vehicles used in public transport which operate without restriction on standard gauge tracks (1 435 mm).

NOTE 1 The testing of the running characteristics of:

- railways with different track layout,
- railways with non-standard gauge tracks

can be conducted by analogy with this document.

The testing of running characteristics is part of the type testing of vehicles which

- are newly developed,
- have had relevant design modifications, or
- have changes in their operating regimes.

The testing and acceptance of running characteristics refers to the complete vehicle including the running gear. If a running gear, which has already been tested and accepted, is to be used under a vehicle body of another design, this is considered to be a design modification. The procedure as described in 5.2 is used.

NOTE 2 In addition to the testing of running characteristics for the acceptance of vehicles, the regulations can be generally applied in other technical tasks, e.g.:

- the checking for compliance against development contracts;
- the optimization of components, vehicles or running gear;
- the testing of influences, influencing parameters and relationships of dependence;
- the monitoring of track or vehicles in operational use.

The application of the full method and the stated limit values reflects (unrestricted) international operation.

Testing for acceptance of vehicles is based on some reference conditions of track. If these are not respected on certain lines, appropriate measures will be taken (speed modifications, additional tests, etc.).

For national or multinational operations the infrastructure managers concerned may authorize variations to the defined conditions. Permissible deviations are indicated in this document.

It is allowed to deviate from the rules laid down if evidence can be furnished that safety is at least the equivalent to that ensured by complying with these rules.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13674-1, *Railway applications — Track — Rail — Part 1: Vignole railway rails 46 kg/m and above*

EN 13715, *Railway applications — Wheelsets and bogies — Wheels — Wheels tread*

EN 13848-1, *Railway applications/Track — Track geometry quality — Part 1: Characterisation of track geometry*

EN 14363:2005, *Railway applications - Testing for the acceptance of running characteristics of railway vehicles - Testing of running behaviour and stationary tests*

3 Terms and definitions

For the purposes of this document, the terms and definitions in EN 14363 apply.

4 Stationary tests

For stationary tests the requirements of EN 14363 shall apply.

5 On-track tests

5.1 General

For vehicles equipped with a cant deficiency compensation system and/or vehicles intended to operate with a higher cant deficiency than stated in EN 14363:2005, Annex G, the table in Annex A of this standard gives the value of cant deficiency to be taken into account.

For the acceptance of such a vehicle the following modification of the procedure defined in EN 14363 shall be respected:

- For speeds above 200 km/h and non-conventional cant deficiencies an additional test section with curve radii between 600 m and 900 m shall be respected.
- For the assessment of the running safety the overturning value η is used as additional parameter. A special assessment method for the estimated maximum value of this parameter is defined.
- The simplified measuring methods are only applicable for extensions of acceptance without extension of cant deficiency.
- For the transition curves the results shall be presented depending on three types of transition curves.

5.2 Type of on-track test and measuring method

5.2.1 Choice of on-track test type

In principle the same procedure as defined in EN 14363:2005, 5.2.1 shall be applied.

For the extension of an acceptance, Table 1 gives the conditions for dispensation or application of partial on-track tests which are required for the use of Figure 13 in EN 14363:2005.

Table 1 — Conditions for dispensation of tests and application of partial 'on-track' tests (see EN 14363:2005, Fig. 13) in case of $\lambda \geq 1,1$

Modified parameter	Dispensation from on-track test	Application of partial 'on-track' test
Operational parameters		
Increase of permissible maximum vehicle speed	--- ^b	0 km/h to +20 km/h
Increase of permissible cant deficiency	--- ^b	--- ^b
Vehicle parameters		
Distance between bogie centres	-5 % to +20 %	-10 % to +A ^a
Virtual lateral position of centre of gravity Γ^g	-20 % to +10 %	
Unsprung mass	-5 % to +5 %	-10 % to +10 %
Primary suspended mass (total mass if vehicle has no secondary suspension level)	-5 % to +5 %	-10 % to +10 %
Secondary suspended mass	-10 % to +10 %	
Moment of inertia of vehicle body (around z-axis)	-10 % to +10 %	
Bogie parameters		
Bogie wheel base	0 % to 5 %	-5 % to +20 %
Nominal wheel diameter	-10 % to +15 %	
Stiffness of primary vertical suspension (vehicles with two suspension levels)	-20 % to +20 %	
Stiffness of secondary vertical suspension (total stiffness at vehicles with one suspension level)	-10 % to +10 %	-10 % to +40 %
Axle guiding: Stiffness	0 % to 10 %	-10 to 10 %
Axle guiding: Damping, clearances, etc.	-10 % to +10 %	
Rotational torque of bogie	-10 % to +10 %	-20 to +20 %
Moment of inertia of whole bogie (around z-axis)	-100 % to +5 %	-100 to +10 %
Secondary lateral suspension (stiffness, damping, clearances, etc.)	-10 % to +10 %	
<p>^a No limitation from this document, there may be restrictions from other regulations</p> <p>^b No dispensation from or reduction of on-track tests</p> <p>^c Complete on-track tests necessary</p> <p>^d Only non-bogied vehicles</p> <p>^e Initial value</p> <p>^f Final value</p> <p>^g $\Gamma = \left(\frac{cd_{adm}}{2b_A} h_g + b \right)$</p> <p>$h_g$ height or centre of gravity relative to top of rail in mm</p> <p>$2b_A$ lateral distance between contact points of the wheels in mm (1500 mm for standard gauge)</p> <p>$b = b_{nom} + b_{qst}$ where</p> <p>b_{nom} is nominal lateral distance of the centre of gravity from the vehicle centre line in mm;</p> <p>b_{qst} is quasi-static displacement of the centre of gravity due to curving, including effects from suspension displacement, a possible cant deficiency compensating system and any other similar system in mm.</p>		

5.2.2 Choice of measuring method

In principle the same procedure as defined in EN 14363:2005, 5.2.2 shall be applied.

For the extension of an acceptance, Table 2 shows the extended conditions for the use of the simplified measuring method and measurement of axle box forces which are required for the use of Figure 15 in 5.2.2.3 of EN 14363:2005. Nevertheless, if there is a modification of the cant deficiency compensating system, the normal measuring method shall be applied.

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