SLOVENSKI STANDARD
SIST EN 15839:2013+A1:2016

01-januar-2016

Železniške naprave - Preskušanje voznih karakteristik pri prevzemu železniških vozil - Tovorni vagoni - Preskušanje vozne varnosti pri vzdolžnih tlačnih silah

Railway applications - Testing for the acceptance of running characteristics of railway vehicles - Freight wagons - Testing of running safety under longitudinal compressive forces

Bahnanwendungen - Prüfung für die fahrtechnische Zulassung von Eisenbahnfahrzeugen - Güterwagen - Prüfung der Fahrsicherheit unter Längsdruckkräften

Applications ferroviaires - Essais en vue de l'homologation du comportement dynamique des véhicules ferroviaires - Wagons - Vérification de la sécurité de circulation des wagons soumis à des forces longitudinales de compression

Ta slovenski standard je istoveten z: **EN 15839:2012+A1:2015**

ICS:

45.060.20	Železniški vagoni	Trailing stock

SIST EN 15839:2013+A1:2016 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 15839:2012+A1

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English Version

Railway applications - Testing for the acceptance of running characteristics of railway vehicles - Freight wagons - Testing of running safety under longitudinal compressive forces

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN 15839:2012+A1:2015) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2016, and conflicting national standards shall be withdrawn at the latest by April 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1 approved by CEN on 2015-08-31.

This document supersedes EN 15839:2012.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

A1 *deleted text* A1

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Due to the operating conditions of braking or propelling, high longitudinal compressive forces can occur between some coupled freight wagons. These forces can be safety related especially in S-shaped curves with small radii under some conditions depending also on the design of the coupling.

This document defines the acceptance process to be followed by vehicles that:

— are equipped with standard ends consisting of side buffers and screw couplers; and

— operated in a way that high longitudinal compressive forces may occur in the trains.

The establishment of this document was based on currently existing rules, practices and procedures in order to define acceptance criteria ensuring a safe operation under the existing operating conditions. It provides a defined testing interface between vehicle design, track layout and braking operation. Investigations according to this standard are not necessary if operating practice shows that a safe operation is achieved without them.

The following principles are 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 shall be tested and homologated before putting them into service. In addition, existing acceptance shall be checked when operating conditions are extended;

3) in view of the significance of international traffic, the harmonisation 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.

This document is derived in essential parts from UIC 530-2, which is based on practical tests performed in ERRI-B12.

The torsional coefficient of the car body c_t^* is a significant parameter for the endurable longitudinal compressive force as well as for the safety against derailment on twisted track as defined in EN 14363. For this reason, a description of a measuring procedure for this parameter is included in this standard. Furthermore, for defined standard freight wagons, the possibility of a dispensation from derailment tests on twisted track according to EN 14363:2005 is defined based on already published calculated results in the diagram collection of UIC 530-2.

Variations from the conditions specified in this document are allowed as specified by Article 7 of Directive 2004/50/EC.

For national or multilateral operations the infrastructure managers concerned may authorise variations to the defined conditions.

1 Scope

This European Standard defines the acceptance process to be followed by vehicles that are operated in trains capable of generating high longitudinal forces and that are susceptible, as a result of their design, to derailment as a result of being subjected to these forces.

This European Standard applies to the following types of freight wagons equipped with standard ends as defined in this EN:

— single wagons;

— permanently coupled units with side buffers and screw couplers between the vehicles;

— permanently coupled units with diagonal buffers with screw couplers between the vehicles;

— articulated units with three 2-axle bogies;

— low-floor wagons with eight or more axles (e.g. rolling road wagon [1)].

The following vehicles are not currently in the scope of this European Standard:

— wagons that are not subjected to extensive longitudinal compressive forces due to their operational environment (as train composition, braking regime, track layout);

— wagons with automatic couplers [2)];

— wagons with 3-axle bogies [3)];

— permanently coupled units with a bar coupler between the vehicles [4)];

— articulated wagons with more than three 2-axle bogies.

Acceptance criteria and test conditions as well as conditions for the dispensation from tests are defined in this European Standard.

This document applies principally to wagons which operate without restriction on standard gauge tracks in Europe (1 435 mm).

NOTE The influence on railway systems using other gauges is not sufficiently understood to extend the scope of this document to gauges other than standard.

2 Normative references

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

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

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1) A description of such vehicles is given in UIC 571-4:2004, 3.4.

2) These wagons are handled in UIC 530-2.

3) Due to their high tare mass and their short length, these wagons need no special investigation according to this standard.

4) A working group of UIC is developing the acceptance conditions for this type of wagon. It is planned to include the regulations into this European Standard.

EN 15551:2009+A1:2010, *Railway applications — Railway rolling stock — Buffers*

EN 15566, *Railway applications — Railway rolling stock — Draw gear and screw coupling*

prEN 16235:2011, *Railway applications — Testing for the acceptance of running characteristics of railway vehicles — Freight wagons — Conditions for dispensation of freight wagons with defined characteristics from on-track tests according to EN 14363*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
torsional coefficient of vehicle body
relevant parameter for running safety under compressive forces and safety against derailment on twisted track

Note1 to entry: The torsional coefficient describes the resistance of the car body structure against a torque around the longitudinal axis.

3.2
safety against derailment on twisted track
safety of a vehicle against wheel climbing of a guiding wheel whilst negotiating a curved track with limit conditions of twist

Note1 to entry: Test conditions are defined in EN 14363.

3.3
endurable longitudinal compressive force
longitudinal force which can be applied on a wagon under defined conditions related to the flanking wagons and the track layout without exceeding limits specified for wheel lift, lateral axle box force, overlap of buffer plates and axle guard deformation

3.4
standard ends
specific design of the coupling end of a wagon equipped with side buffers and screw couplers

Note1 to entry: Geometric location of buffers and draw gear is specified in CR TSI RST FW (freight wagons), 4.2.2.1. Characteristics of buffers are specified in EN 15551, characteristics of draw gear are specified in EN 15566.

3.5
permanently coupled unit
unit consisting of several elements (single wagons fitted with bogies or single axle running gear), equipped at both ends with side buffers and screw couplers as defined in 3.4 where the elements cannot be operated separately

3.6
articulated unit
unit consisting of several elements, connected with articulations and equipped at both ends with side buffers and screw couplers as defined in 3.4 where the elements cannot be operated separately

4 Deviations from requirements

If deviating from some points of the requirements of this standard for a particular assessment, these deviations shall be reported and explained. Then the influence on the assessment of the vehicle in terms

of the acceptance criteria shall be evaluated and recorded. The outcome of this study shall be considered as an integral part of the requirements of this standard when applied to the assessment process of the vehicle.

5 Evaluation of the torsional coefficient of a car body c^*_t

The torsional coefficient c_t^* is a basic parameter of a vehicle related to the safety against derailment under longitudinal compressive forces and influences also the safety against derailment on twisted track together with the suspension system. It is defined by the following formula:

$$c_t^* = M_t / \left(\frac{\vartheta}{l}\right) = (M_t / \vartheta) l \qquad (1)$$

where

M_t is the torsional moment

ϑ is the angle of torsion

l is the support length (longitudinal)

To determine the torsional coefficient value of a car body, different methods of testing can be used. Suggested methods are given in the informative Annex C.

NOTE Body roll moment, effects of hysteresis or non-linearities possibly influencing test results are not included in the definition of the torsional coefficient c_t^*.

6 Condition for dispensation from tests or calculations regarding the safety against derailment on twisted track

A dispensation from tests and calculations on the safety against derailment according to EN 14363:2005, 4.1 for freight wagons is permitted if the parameters and running gear types match with those that have showed results compliant with the limit values in published tests and the wheel flange angle is 70°.

NOTE Parameters and running gear types that meet the required criteria are included in the tabulated results given in Annex A, Annex B and Annex C of UIC 530-2:2008, available on UIC website www.uic.org/spip.php?article1521 (select French or German).

7 Proof of the endurable longitudinal compressive force by propelling tests

7.1 General

It is required under the test conditions defined below that the endurable longitudinal compressive force of the investigated vehicle is higher than:

— 200 kN for wagons or units equipped with single axle running gear;

— 240 kN for wagons or units equipped with 2-axle bogies.

This shall be demonstrated by compliance with the assessment criteria specified in 7.3.

7.2 Conditions for dispensation from tests

7.2.1 General

For wagons with specific parameters defined in 7.2.2, 7.2.3 and 7.2.4 evidence already exists that the assessment criteria specified in 7.3 are complied with under the defined test conditions up to the

required endurable longitudinal compressive forces. Wagons to be investigated and fulfilling the same criteria have dispensation from tests.

Another possibility for dispensation from tests is the reference to a similar vehicle (regarding the relevant parameters given in the chapters 7.2.2, 7.2.3 and 7.2.4) which showed acceptable results in tests.

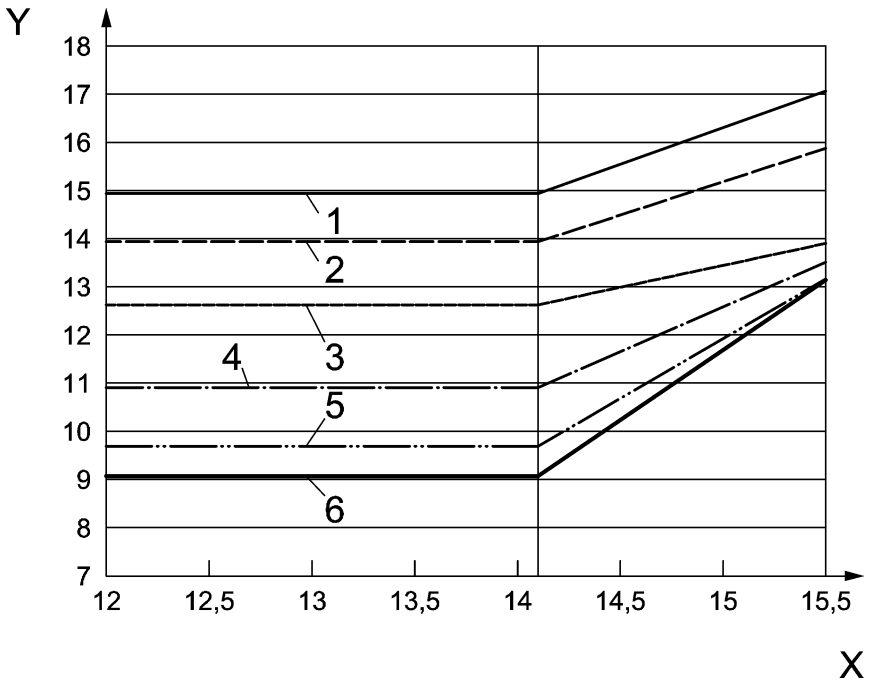
NOTE A data base with test results from wagons which passed the propelling test is available at the moment via UIC-website www.uic.org/spip.php?article1521 (only available in French and German).

7.2.2 2-axle wagons

For single 2-axle wagons dispensation from tests is allowed if the technical parameters given in Table 1 are fulfilled.

Table 1 — Parameters to be met for dispensation from propelling tests for 2-axle vehicles

Torsional coefficient (c_t*)	$c_t^* \geq 0{,}5 \cdot 10^{10}$ kNmm^2/rad	
Distance between the axles (2a*)	9 m ≤ 2a* ≤ 10 m	
Length over buffer (LoB)	LoB < 14,1 m	14,1 m ≤ LoB ≤ 15,5 m
Overhang	Ovh ≥1,5 m	No limitation
Minimum tare weight (t)	According to Figure 1 at LoB = 14,1 and depending on torsional coefficient. NOTE UIC 530-2 states that only a tare weight of 11,5 t is required independent from c_t^*. This would not be consistent with the diagram in Figure 1. Furthermore, UIC experts stated that it was never intended to give a dispensation from tests to wagons in this range It is proposed to use the above formulation until results of propelling tests show that lower tare weights are possible to fulfil the requirements of endurable longitudinal forces.	According to Figure 1, depending on torsional coefficient and LoB.
Nominal wheel diameter (D)	730 mm ≤ D ≤ 1 000 mm	
Type of running gear	Double link suspension and suspension "Niesky 2" as defined in prEN 16235:2011.	
Spherical radius of buffer head (R_P), nominal value (see also Annex B, Detail X)	R_P = 2 750 mm (or = 750 mm for diagonal buffers)	



Key

X length over Buffer (LoB) [m]

Y minimum tare weight [t]

1 $c_t^* = 0{,}5 \times 10^{10}$ kNmm^2/rad

2 $c_t^* = 1{,}0 \times 10^{10}$ kNmm^2/rad

3 $c_t^* = 1{,}5 \times 10^{10}$ kNmm^2/rad

4 $c_t^* = 2{,}0 \times 10^{10}$ kNmm^2/rad

5 $c_t^* = 3{,}0 \times 10^{10}$ kNmm^2/rad

6 $c_t^* = 4{,}0 \times 10^{10}$ kNmm^2/rad

Figure 1 — Minimum vehicle tare load for dispensation from propelling tests for 2-axle vehicles

7.2.3 Permanently coupled units consisting of two 2-axle wagons

Permanently coupled units consisting of two 2-axle wagons

— with standard end arrangement at the permanent coupled interface or

— with 2 diagonal buffers and draw gear according to [A1] Figure B.1 [A1] at the permanent coupled interface

shall be treated like a single wagon equipped with the standard end arrangement.

If the height of the permanently coupled end is more than 100 mm below the outer ends, the influence of the wheelset unloading under longitudinal compressive forces of 200 kN on straight track shall be taken into account: The minimum axle load under this condition shall be 50 % of the minimum tare weight given in Figure 1.

7.2.4 Wagons with 2-axle bogies

A dispensation from tests is allowed if the technical parameters given in Table 2 are fulfilled.