Railway applications — Testing and Simulation for the acceptance of running characteristics of railway vehicles — Running Behaviour and stationary tests

Bahnanwendungen — Versuche und Simulationen für die Zulassung der fahrechtechnischen Eigenschaften von Eisenbahnfahrzeugen — Fahrverhalten und stationäre Versuche

Applications ferroviaires — Essais et simulations en vue de l'homologation des caractéristiques dynamiques des véhicules ferroviaires — Comportement dynamique et essais stationnaires

ICS 45.060.01

Identical (IDT) with EN 14363:2016-03

Supersedes ÖNORM EN 14363:2010-03; ÖNORM EN 15686:2010-10; ÖNORM EN 15687:2010-10

responsible Committee 213
Railway applications
Railway applications - Testing and Simulation for the acceptance of running characteristics of railway vehicles - Running Behaviour and stationary tests
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European foreword

This document (EN 14363:2016) 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of an identical text or by endorsement, at the latest by September 2016, and conflicting national standards shall be withdrawn at the latest by September 2016.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 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 Directive(s).

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

It is not necessary to require further assessment of vehicles which have been already assessed under the conditions of previous standards in this field. Test results achieved under the conditions of the previous standards remain valid and can be used for the extension of acceptance of a vehicle or vehicle design according to this standard.

Prior to the first issue of this standard, national procedures were applied for vehicle acceptance, for example in Germany or UK. The underlying principles that were applied in these earlier standards are also incorporated in this standard. The fundamentals have not been changed but the formulation of the requirements has been made consistent. Therefore it is considered that also vehicles that were previously approved utilizing these earlier requirements have an equal status compared to vehicles that are approved according to this standard. This applies to the infrastructure and operating conditions that were considered in the earlier approval. This includes also a use as reference vehicle for extension of acceptance.

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

Acceptable running characteristics of a railway vehicle (hereafter called vehicle) are essential for a safe and economic operation of a railway system. They are related to:

— the vehicle,
— the operating conditions,
— the characteristics of the infrastructure (track layout design and track quality) and
— the contact conditions of the wheel/rail interface.

The objective is to quantify the vehicle's performance under known representative conditions of operation and infrastructure.

This standard describes methods to assess the vehicle performance in the following areas:

— safety against derailment on twisted track (see 6.1);
— running safety under longitudinal compressive forces in s-shaped curves (see 6.2);
— evaluation of the torsional coefficient (see 6.3);
— determination of displacement characteristics (see 6.4);
— loading of the diverging branch of a switch (see 6.5);
— running safety in curved crossings (see 6.6);
— running safety, track loading and ride characteristics (see Clause 7).

The vehicle performance is assessed in two stages. Usually in the first stage the basic characteristics and low speed behaviour are investigated before first runs on the line under controlled operating conditions. In the second stage the running behaviour is assessed. The assessment of a vehicle according to the elements listed above can be performed either by physical testing, numerical simulation, calculation or comparison with a known solution (dispensation). Details about the requirements relating to the choice of the appropriate assessment method are given in this document.

The operational envelope (speed and cant deficiency) that the vehicle has been assessed for needs to be documented.

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

— the railway system requires comprehensive technical rules in order to ensure an acceptable interaction of vehicle and track;
— the performance of new railway vehicles has to be evaluated and assessed before putting them into service;
— it is of particular importance that the existing level of safety and reliability is not compromised even when changes in design or operating conditions are demanded, e.g. by the introduction of higher speeds, higher vertical wheel forces, modification of the suspension, etc.
— it is possible to demonstrate compliance with the requirements of this standard by comparison of relevant parameters or by simulation if changes are made to the design or to the operating conditions;
— as the combination of all the target test conditions described is not always achievable, the compliance against the missing target test conditions can be demonstrated by other means.

Requirements on running safety under longitudinal compressive forces in S-shaped curves of certain vehicles are given in EN 15839, while EN 16235 specifies a method to get dispensation from on-track...
testing for vehicles equipped with established and standardized running gear, if certain conditions are fulfilled.

The informative Annexes A, B, C, D, E, F; Q, S, T and U contain requirements that have to be fulfilled when the annex is applied.