

<b>STN</b>	<b>Železnice. Požiadavky týkajúce sa nakoľajovania a vyprost'ovania koľajových vozidiel.</b>	<b>STN EN 16404</b>  28 2291
------------	--	--

Railway applications - Re-railing and recovery requirements for railway vehicles

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 07/16

Obsahuje: EN 16404:2016

Oznámením tejto normy sa ruší  
STN EN 16404 (28 2291) z júna 2014

**123248**

EUROPEAN STANDARD

**EN 16404**

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2016

ICS 45.060.01

Supersedes EN 16404:2014

English Version

## Railway applications - Re-railing and recovery requirements for railway vehicles

Applications ferroviaires - Exigences relatives au  
réenraillement et au rétablissement de véhicules  
ferroviaires

Bahnanwendungen - Anforderungen für das Aufgleisen  
und Bergen von Schienenfahrzeugen

This European Standard was approved by CEN on 22 November 2015.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



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

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

<b>Contents</b>	<b>Page</b>
European foreword.....	4
Introduction .....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions .....	7
4 Requirements for the re-railing and recovery of rail vehicles .....	9
4.1 General requirements for all vehicles .....	9
4.2 Required lifting operations .....	9
4.2.1 Lifting operations for all rail vehicles.....	9
4.2.2 Lifting operations for articulated vehicles and/or fixed formations.....	10
4.2.3 Provision of lifting points.....	11
4.2.4 Requirements for marking and documentation .....	11
4.3 Vehicle masses for lifting .....	11
5 Vehicle interface and functional requirements for lifting, re-railing and support.....	12
5.1 Lifting, re-railing and support points .....	12
5.1.1 Minimum functional requirements for jacking.....	12
5.1.2 General design requirements for lifting point locations .....	13
5.1.3 Longitudinal location of jacking points.....	13
5.1.4 Jacking equipment clearance zones .....	14
5.1.5 Lifting requirements when using cranes.....	17
5.1.6 Re-railing position design space envelopes .....	17
5.1.7 Additional clearances required for single end lifting.....	18
5.1.8 Support points.....	18
5.1.9 Bogie support points.....	18
5.2 Jacking point geometry .....	19
5.3 Lifting brackets.....	19
5.4 Securing of running gear to the underframe.....	20
6 Design load cases for re-railing and recovery equipment .....	20
6.1 General design principles .....	20
6.2 Workshop vehicle lifting .....	21
6.3 Re-railing and recovery design scenarios.....	21
6.3.1 Design scenario 1 .....	21
6.3.2 Design scenario 2 .....	21
6.3.3 Design scenario 3 .....	22
6.4 Lifting brackets.....	22
6.4.1 Lifting bracket structural design requirements .....	22
6.4.2 Lifting bracket strength requirements .....	23
7 Markings for lifting points .....	24
8 Documentation for re-railing and recovery .....	24
8.1 General documentation requirements.....	24
8.2 Recovery Risk Assessment.....	24
8.3 Lifting instructions .....	25
8.4 Lifting diagram.....	25

<b>8.4.1</b>	<b>General lifting diagram requirements</b> .....	<b>25</b>
<b>8.4.2</b>	<b>Side elevation</b> .....	<b>26</b>
<b>8.4.3</b>	<b>End elevation and/or cross-sections</b> .....	<b>26</b>
<b>8.4.4</b>	<b>Mass data</b> .....	<b>27</b>
<b>9</b>	<b>Validation</b> .....	<b>27</b>
	<b>Annex A (normative) Space envelopes for re-railing equipment</b> .....	<b>28</b>
	<b>Annex B (normative) Standard lifting bracket (100 kN to 220 kN)</b> .....	<b>31</b>
	<b>Annex C (normative) Standard lifting bracket (for up to 335 kN)</b> .....	<b>36</b>
	<b>Annex D (normative) Lifting bracket (for up to 170 kN)</b> .....	<b>41</b>
	<b>Annex E (normative) Lifting bracket (for up to 340 kN)</b> .....	<b>44</b>
	<b>Annex F (informative) Migration rule for this European Standard</b> .....	<b>48</b>
	<b>Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC</b> .....	<b>49</b>

## European foreword

This document (EN 16404:2016) 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 July 2016, and conflicting national standards shall be withdrawn at the latest by July 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 supersedes EN 16404:2014.

The main changes from the previous edition are listed below:

- clarification of the use of re-railing beams and/or support points;
- clarification of jacking equipment clearances;
- additional requirements for lifting low floor vehicles;
- definition of smaller jack space envelopes for jacks up to 20 t capacity;
- requirements for the use of jack adaptors with lifting brackets;
- lifting requirements when using cranes;
- Annex E: Definition of a non-standard 340 kN lifting bracket as used on GB locomotives.

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 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

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

Rail vehicles are designed so that re-railing and recovery operations after a derailment or accident can be safely undertaken without exposing persons to undue risk during lifting and jacking operations.

For rolling stock of interoperable trains there is a need to define common requirements in terms of lifting and jacking operations, equipment space envelopes and lifting accessories.

Foreseeable factors that can influence a re-railing or recovery operation include:

- final vehicle position relative to the track;
- weight transfer due to final vehicle orientation (inclination or roll);
- vehicle load, possible overloading or uneven loading;
- load movement or shifting;
- embedding of parts of the vehicle in the ground;
- sinking of jacks (soft ground);
- structural distortion/damage;
- jerking or snatching of lifting equipment.

The majority of these factors cannot be quantified either in advance or during a recovery operation and therefore precise requirements cannot be set out in this European Standard and accordingly design scenarios are used. The resulting requirements together with competent persons undertaking the re-railing or recovery operation using the documentation specified are considered to be sufficient to ensure that the overall objectives are satisfied.

## 1 Scope

This European Standard is applicable to all railway vehicles that will operate under the Interoperability Directives taking into consideration the recommendations given in Annex F on the application of the standard (migration rule).

Rolling stock of the following types are excluded from the scope of this draft European Standard:

- metros, tramways, and other light rail vehicles;
- vehicles for the operation of local, urban or suburban passenger services on networks that are functionally separate from the rest of the railway system;
- vehicles exclusively used on privately owned railway infrastructure that exist solely for use by the owner for its own freight operations;
- vehicles reserved for a strictly local, historical or touristic use.

On-track machines are in the scope of this European Standard only when in transport (running) configuration on their own rail wheels, either self-propelled or hauled.

However, the requirements may be appropriate for other applications that have similar operational conditions. It specifies the principles and processes to be followed to achieve satisfactory arrangements for re-railing or recovery of railway vehicles and to validate the design against the relevant performance and safety requirements.

The interface between the re-railing and recovery equipment and the vehicle structure is considered as the interface between the jack contact faces or the lifting bracket contact areas. The structural requirements for the vehicle structure are set out in EN 12663-1 and EN 12663-2.

NOTE Railway vehicles that will operate under the Interoperability Directives correspond to the categories L, P-I, P-II, F-I and F-II defined in EN 12663-1.

## 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 12663-1, *Railway applications — Structural requirements of railway vehicle bodies — Part 1: Locomotives and passenger rolling stock (and alternative method for freight wagons)*

EN 12663-2, *Railway applications - Structural requirements of railway vehicle bodies - Part 2: Freight wagons*

EN 13155, *Cranes — Safety — Non-fixed load lifting attachments*

EN 15663, *Railway applications - Definition of vehicle reference masses*

EN 15877-1, *Railway applications - Marking on railway vehicles - Part 1: Freight wagons*

EN 15877-2, *Railway applications - Markings of railway vehicles - Part 2: External markings on coaches, motive power units, locomotives and on-track machines*

EN 22768-1, *General tolerances - Part 1: Tolerances for linear and angular dimensions without individual tolerance indications (ISO 2768-1)*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**