

RAUDTEEALASED RAKENDUSED. KÄITUSNÕUDED  
KASUTUSES RATTAPAARIDELE. KASUTUSES JA  
VEEREMILT EEMALDATUD RATTAPAARIDE  
HOOLDAMINE

Railway applications - In-service wheelset operation  
requirements - In-service and off-vehicle wheelset  
maintenance

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 15313:2016 sisaldab Euroopa standardi EN 15313:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 15313:2016 consists of the English text of the European standard EN 15313:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 13.04.2016.	Date of Availability of the European standard is 13.04.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 45.040

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Aru 10, 10317 Tallinn, Eesti; koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

English Version

## Railway applications - In-service wheelset operation requirements - In-service and off-vehicle wheelset maintenance

Application ferroviaires - Exploitation des essieux en service - Maintenance des essieux en exploitation ou déposés

Bahnanwendungen - Radsätze und Drehgestelle - Radsatzinstandhaltung

This European Standard was approved by CEN on 3 December 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**

# Contents

Page

European foreword .....	6
Introduction .....	7
1 Scope .....	8
2 Normative references .....	9
3 Terms and definitions .....	9
4 Maintenance .....	10
4.1 General.....	10
4.2 Maintenance organization.....	11
4.2.1 Maintenance organization plan .....	11
4.2.2 Maintenance plan.....	11
4.2.3 Service experience .....	12
4.2.4 Traceability – storage – transportation .....	12
4.3 Equipment and systems .....	14
4.4 Staff certification and competence .....	14
4.5 Qualification of an undertaking for the maintenance of in-service or off-vehicle wheelsets .....	14
5 Definition and illustrations of a boxed wheelset, its associated components and defects .....	16
5.1 Definition and illustrations of a wheelset.....	16
5.1.1 Wheelset .....	16
5.1.2 Axle .....	18
5.1.3 Wheel .....	19
5.1.4 Axle box .....	21
5.2 Functional references of the rail-wheel interface.....	21
5.2.1 Wheelset functional references.....	21
5.2.2 Wheel functional references.....	22
5.3 Definition and illustrations of defects .....	23
6 Requirements and operations .....	23
6.1 General.....	23
6.2 Requirements.....	24
6.2.1 In-service limit dimensions and positions .....	24
6.2.2 Special maintenance action for freight wagon axles according to axle load.....	27
6.2.3 Maintenance decision criteria for in-service wheels for all types of wheel.....	28
6.2.4 Maintenance decision criteria for in-service wheels for specific wheel types.....	31
6.2.5 Damage acceptance limits for axle bodies .....	31
6.2.6 Criteria for axle box (Annex C.5).....	32
6.2.7 Criteria on boxed wheelsets .....	32
6.2.8 Specific requirements for tyred wheels and resilient wheels .....	33
6.2.9 Limit value for axle wheel seat diameter.....	34
6.3 Reprofilng operation .....	34
6.4 Dimensions and conditions after reprofiling or an operation on the rim .....	35
6.4.1 Front-to-front dimension "a <sub>2</sub> ".....	35
6.4.2 Diameter difference between wheels on the same axle.....	35
6.4.3 Limit values of radial run-out as a function of the maximum operating speed authorized for the vehicle.....	35
6.4.4 Wheel axial run-out as a function of the maximum operating speed authorized for the vehicle.....	35
6.4.5 Parts of the tread that are not re-profiled.....	35
6.4.6 Radial traces and radial defects on the internal side of the rim .....	36
6.5 Operations, examinations and inspections .....	36
6.5.1 General.....	36
6.5.2 Detection of tread defects.....	36

6.5.3	Detection of thermal damage on the wheel rim or tyre .....	37
6.5.4	Detection of wheel tread roll-over .....	37
6.5.5	Detection of damage to chamfered corner and flange .....	37
6.5.6	Detection of damage resulting from identification markings .....	37
6.5.7	Detection of defects on the external and internal face of the rim .....	37
6.5.8	Verification of web integrity .....	37
6.5.9	Verification of hub integrity .....	38
6.5.10	Verification of rim integrity - Detection of deep sub-surface tread defects .....	38
6.5.11	Detection of thermal defects on the web of a wheel used as a braking surface .....	38
6.5.12	Detection of overheating affecting the wheel rim-web transition on monobloc wheels .....	38
6.5.13	Verification of axle surface integrity .....	38
6.5.14	Detection of damage caused by corrosion .....	40
6.5.15	Detection of circumferential defects around the whole circumference .....	40
6.5.16	Detection of circumferential defects in a singular section of the circumference .....	40
6.5.17	Detection of notches and impact damage .....	41
6.5.18	Detection of longitudinal defects on axles .....	41
6.5.19	Detection of damage in interference fit zones .....	41
6.5.20	Verification after rectification .....	41
6.5.21	Verification of residual magnetism .....	41
6.5.22	Lubrication operation .....	41
6.5.23	Checking for axle box defects .....	41
6.5.24	Verification of wheelset electrical resistance after heavy maintenance of boxed wheelsets .....	41
6.6	Requirements for additional maintenance equipment and operations .....	42
7	In-service boxed wheelset maintenance .....	42
7.1	Maintenance plan .....	42
7.2	Wheelset protection during vehicle and bogie cleaning .....	42
8	Off-vehicle wheelset maintenance .....	42
8.1	Maintenance plan .....	42
8.2	Key operations for off-vehicle wheelset maintenance .....	43
8.3	Off-vehicle boxed wheelset cleaning .....	43
8.4	NDT Interval .....	43
9	Action to be taken on any wheelset after an incident in service or when not covered by the maintenance plan .....	44
9.1	Wheelset bearings subject to water ingress .....	44
9.2	Wheelsets having been subjected to a short circuit current (e.g. from falling overhead line equipment, etc.) .....	44
9.3	Detection by a trackside facility of a wheel circularity defect .....	44
9.4	Wheelsets loaded over the allowed limit .....	44
9.5	Hot axle box detection .....	45
9.5.1	General .....	45
9.5.2	Technical procedure .....	45
9.6	Derailment .....	45
9.7	Head-on collision .....	45
9.8	Lubricant leakage or loss from the axle box .....	46
9.9	Brake incident (detection of seized brake or discoloration) .....	46
9.10	Reporting after detection of a wheelset irregularity outside the maintenance plan .....	46
10	Equipment not subject to Directive 2008/57/EC .....	46
11	Summary table of requirements of this standard .....	46
Annex A	(normative) Minimum database content for freight wagon wheelset traceability .....	47
A.1	Data categories for storage time .....	47
A.2	Minimum data to be collected .....	47
A.2.1	Boxed wheelset .....	47
A.2.2	Wheelset axle .....	49
A.2.3	Wheels .....	50
A.2.4	Bearings .....	51
A.2.5	Medium and heavy wheelset maintenance .....	51

<b>A.2.6</b>	<b>Vehicle in which the boxed wheelset is mounted (not applicable for bogies with variable gauge) and in-service incidents (since applying traceability system).....</b>	<b>52</b>
<b>A.3</b>	<b>Measures to be applied resulting from lack of traceability .....</b>	<b>52</b>
<b>Annex B</b>	<b>(informative) Database content for the tractability of wheelsets of vehicles in the scope of TSI “Rolling stock - Locomotive and passenger rated vehicles” (TSI Loc &amp; Pas).....</b>	<b>54</b>
<b>B.1</b>	<b>Data categories for storage time.....</b>	<b>54</b>
<b>B.2</b>	<b>Minimum data to be collected .....</b>	<b>54</b>
<b>B.2.1</b>	<b>Boxed wheelset.....</b>	<b>54</b>
<b>B.2.2</b>	<b>Axle .....</b>	<b>56</b>
<b>B.2.3</b>	<b>Wheels .....</b>	<b>57</b>
<b>B.2.4</b>	<b>Bearings.....</b>	<b>58</b>
<b>B.2.5</b>	<b>Medium and heavy wheelset maintenance .....</b>	<b>58</b>
<b>B.2.6</b>	<b>Vehicle in which the boxed wheelset is mounted (not applicable for bogies with variable gauge) and in-service incidents (since applying traceability system).....</b>	<b>59</b>
<b>B.3</b>	<b>Measures to be applied resulting from lack of traceability .....</b>	<b>60</b>
<b>Annex C</b>	<b>(normative) Definition and illustration of defects .....</b>	<b>61</b>
<b>C.1</b>	<b>General.....</b>	<b>61</b>
<b>C.2</b>	<b>Defects for all types of wheel .....</b>	<b>61</b>
<b>C.2.1</b>	<b>Wheel flat .....</b>	<b>61</b>
<b>C.2.2</b>	<b>Metal build-up.....</b>	<b>62</b>
<b>C.2.3</b>	<b>Shelling, cavities.....</b>	<b>63</b>
<b>C.2.4</b>	<b>Scaling .....</b>	<b>63</b>
<b>C.2.5</b>	<b>Tread indentation.....</b>	<b>64</b>
<b>C.2.6</b>	<b>Isolated transverse cracking .....</b>	<b>64</b>
<b>C.2.7</b>	<b>Circularity defect.....</b>	<b>65</b>
<b>C.2.8</b>	<b>Spalling (thermal effects due to tread braking) .....</b>	<b>67</b>
<b>C.2.9</b>	<b>Rolling contact fatigue .....</b>	<b>68</b>
<b>C.2.10</b>	<b>Thermal cracks.....</b>	<b>68</b>
<b>C.2.11</b>	<b>Wheel tread roll-over .....</b>	<b>70</b>
<b>C.2.12</b>	<b>Damage to chamfered corner.....</b>	<b>70</b>
<b>C.2.13</b>	<b>Wheel tread – grooves and channels (or smooth edged circumferential grooves and sharp edged circumferential fluting) .....</b>	<b>71</b>
<b>C.2.14</b>	<b>False flange .....</b>	<b>72</b>
<b>C.2.15</b>	<b>Damage on the flange .....</b>	<b>74</b>
<b>C.2.16</b>	<b>Sharp-edged radial marks and radial defects on the internal face of the rim (FIJ) .....</b>	<b>75</b>
<b>C.2.17</b>	<b>Damage resulting from identification markings .....</b>	<b>76</b>
<b>C.2.18</b>	<b>Damage from lathe driving tools.....</b>	<b>77</b>
<b>C.2.19</b>	<b>Sharp-edged circumferential defects on the web or wheel centre.....</b>	<b>77</b>
<b>C.2.20</b>	<b>Sharp-edged radial defect on the web.....</b>	<b>78</b>
<b>C.2.21</b>	<b>Wheel web hole defects .....</b>	<b>78</b>
<b>C.2.22</b>	<b>Cracks in the wheel hub.....</b>	<b>79</b>
<b>C.3</b>	<b>Defects specific to wheel types.....</b>	<b>79</b>
<b>C.3.1</b>	<b>Deep sub-surface tread defect on monobloc wheels .....</b>	<b>79</b>
<b>C.3.2</b>	<b>Wheel web defects on monobloc wheels.....</b>	<b>80</b>
<b>C.3.3</b>	<b>Exceptional thermomechanical stressing in tyred wheels .....</b>	<b>82</b>
<b>C.4</b>	<b>Axle defects.....</b>	<b>82</b>
<b>C.4.1</b>	<b>Axle protection defect – Damage on the painting/coating .....</b>	<b>82</b>
<b>C.4.2</b>	<b>Corrosion.....</b>	<b>83</b>
<b>C.4.3</b>	<b>Circumferential defects.....</b>	<b>84</b>
<b>C.4.4</b>	<b>Notches and impact damage .....</b>	<b>86</b>
<b>C.4.5</b>	<b>Longitudinal defects.....</b>	<b>87</b>
<b>C.4.6</b>	<b>Damage in the interference fit zones .....</b>	<b>87</b>
<b>C.5</b>	<b>Axle box defects .....</b>	<b>88</b>
<b>C.6</b>	<b>Wheelset defects.....</b>	<b>89</b>
<b>C.6.1</b>	<b>General.....</b>	<b>89</b>
<b>C.6.2</b>	<b>Wheel distortion.....</b>	<b>89</b>
<b>C.6.3</b>	<b>In service axial or angular movement of a wheel or of one of the other components .....</b>	<b>90</b>
<b>C.6.4</b>	<b>Bent axle .....</b>	<b>91</b>

<b>Annex D (normative) Freight stock</b> .....	<b>92</b>
<b>Annex E (informative) Rim size without roll-over for equipment not subject to Directive 2008/57/EC</b> .....	<b>93</b>
<b>Annex F (normative) Definitions of Type A and B axles</b> .....	<b>94</b>
<b>Annex G (informative) Permissible circularity defects</b> .....	<b>97</b>
<b>Annex H (informative) Tyred wheels and resilient wheels</b> .....	<b>98</b>
H.1 General .....	98
H.2 Marking of tyred wheels and resilient wheels .....	98
H.2.1 General .....	98
H.2.2 Tyre thickness of tyred wheels .....	99
H.3 Defects specific to tyred wheels.....	100
H.4 Verification of the electrical resistance during medium and heavy maintenance .....	101
<b>Annex I (normative) Reference images for axle surface condition limits for off vehicle wheelset maintenance</b> .....	<b>102</b>
I.1 General .....	102
I.2 Local and severe defect.....	102
I.3 Large and heavily corroded areas, strongly and uniformly pitted surface .....	103
I.4 Corrosion defects in abutment area and transition radii .....	104
<b>Annex J (informative) NDT interval</b> .....	<b>105</b>
J.1 General .....	105
J.2 Axle .....	105
J.3 Wheel .....	105
<b>Annex K (informative) Summary of the requirements of this standard for in-service boxed wheelsets</b> .....	<b>106</b>
<b>Annex L (informative) Characteristics of narrow gauge wheelsets</b> .....	<b>108</b>
<b>Annex M (informative) Characteristics of Spanish and Portuguese gauge wheelsets</b> .....	<b>109</b>
<b>Annex N (informative) Characteristics of Finnish and Baltic Country Gauge Wheelsets</b> .....	<b>110</b>
<b>Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC aimed to be covered</b> .....	<b>111</b>
<b>Bibliography</b> .....	<b>114</b>

## European foreword

This document (EN 15313:2016) 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, by October 2016 at the latest, and conflicting national standards shall be withdrawn at the latest by October 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of intellectual property or similar rights. CEN and CENELEC shall not be held responsible for not having identified such property rights and notifying of their existence.

This document supersedes EN 15313:2010.

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: Germany, Former Yugoslav Republic of Macedonia, Austria, Belgium, Bulgaria, Cyprus, Croatia, Denmark, Spain, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Norway, the Netherlands, Poland, Portugal, Czech Republic, Romania, United Kingdom, Slovakia, Slovenia, Sweden, Switzerland and Turkey.

## Introduction

The objectives of this amendment to EN 15313:2010 are to:

- Incorporate the appropriate results of the ERA TF “Maintenance of freight wagons” established following the Viareggio accident of June 2009:
  - Common criteria for the inspection of freight wagon axles (European Visual Inspection Catalogue) (see 6.5.13.2);
  - A system to ensure the traceability of in-service wagon axles (see 4.2.4.3.2 and Annex A);
  - Specific maintenance action according to axle load (see 6.2.2);
- Improve the standard in the light of experience acquired during its application;
- Resolve the outstanding issues from the “Comments Resolution Meeting” and the Formal Voting process, and in particular the maintenance action to be taken for axles loaded over the allowed limit (see 9.4);
- Recommend the use of a traceability system for in-service locomotive and passenger vehicle axles based on that for freight wagons (see 4.2.4.3.3 and Annex B);
- Provide requirements for tired wheels and resilient wheels (see 6.2.8).

## 1 Scope

To ensure safety and interoperability, this Standard gives:

- the limits for in-service and off-vehicle wheelsets;
- the operations to be carried out for which the specific values (and/or criteria) remain to be defined in the maintenance plan.

This European Standard applies to wheelsets and axle boxes complying with the following European Standards:

- EN 13103, EN 13104;
- EN 13260, EN 13261, EN 13262;
- EN 13979-1;
- EN 13715;
- EN 13749.

that comprise:

- the axle mounted with wheel diameters greater than or equal to 330 mm;
- axle boxes with bearings and grease.

This European Standard is also applicable to wheelsets:

- fitted with brake discs, final drive, transmission or noise-damping systems, as appropriate;
- not complying with the above European Standards, but complying with the international requirements in force, for example in UIC leaflets, before the approval of these standards;
- with tyred wheels;
- with resilient wheels.

For equipment not covered by Directive 2008/57/EC, this European Standard may be applied, noting that different values may be used.

All dimensions in this Standard are in millimetres (mm).

It is necessary to describe in a specific document the tasks to be performed in order to maintain wheelsets within the limits defined therein.

NOTE The specific values and criteria are defined in an appropriate maintenance plan.

## 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 13260, *Railway applications — Wheelsets and bogies — Wheelsets — Product requirements*

EN 13261, *Railway applications — Wheelsets and bogies — Axles — Product requirements*

EN 13262, *Railway applications — Wheelsets and bogies — Wheels — Product requirements*

EN 13715, *Railway applications — Wheelsets and bogies — Wheels — Tread profile*

EN 13979-1:2003+A2:2011, *Railway applications — Wheelsets and bogies — Monobloc wheels — Technical approval procedure — Part 1: Forged and rolled wheels*

EN 15085-2, *Railway applications. Welding of railway vehicles and components — Part 2: Quality requirements and certification of welding manufacturer*

EN ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel (ISO 9712)*

EN ISO 9934-1, *Non-destructive testing — Magnetic particle testing — Part 1: General principles (ISO 9934-1:)*

EN ISO 9934-2, *Non-destructive testing — Magnetic particle testing — Part 2: Detection media (ISO 9934-2:)*

EN ISO 9934-3, *Non-destructive testing — Magnetic particle testing — Part 3: Equipment. (ISO 9934-3:)*

NOTE A standard relating to NDT in railway applications is currently being prepared and may be used as a reference in NDT performed on wheelsets following its publication.

## 3 Terms and definitions

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

### 3.1

#### **operation**

normal use of wheelsets in service on the track or during routine planned maintenance

NOTE 1 to entry This term also includes any in-service problems and their treatment.

### 3.2

#### **competent technical department**

department having experience in the wheelset maintenance field having already written the rules

### 3.3

#### **technical expert**

technical expert competent in the maintenance of wheelsets

### 3.4

#### **ECM**

Entity in Charge of Maintenance