DIN EN 15313:2016-09 (E)

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

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 Reprofiling operation 34
6.4 Dimensions and conditions after reprofiling or an operation on the rim 35
6.4.1 Front-to-front dimension "a2" 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
A.2.6 Vehicle in which the boxed wheelset is mounted (not applicable for bogies with variable gauge) and in-service incidents (since applying traceability system) 52
A.3 Measures to be applied resulting from lack of traceability 52

Annex 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 & Pas) 54

B.1 Data categories for storage time 54
B.2 Minimum data to be collected 54
B.2.1 Boxed wheelset 54
B.2.2 Axle 56
B.2.3 Wheels 57
B.2.4 Bearings 58
B.2.5 Medium and heavy wheelset maintenance 58
B.2.6 Vehicle in which the boxed wheelset is mounted (not applicable for bogies with variable gauge) and in-service incidents (since applying traceability system) 59
B.3 Measures to be applied resulting from lack of traceability 60

Annex C (normative) Definition and illustration of defects 61

C.1 General 61
C.2 Defects for all types of wheel 61
C.2.1 Wheel flat 61
C.2.2 Metal build-up 62
C.2.3 Shelling, cavities 63
C.2.4 Scaling 63
C.2.5 Tread indentation 64
C.2.6 Isolated transverse cracking 64
C.2.7 Circularity defect 65
C.2.8 Spalling (thermal effects due to tread braking) 67
C.2.9 Rolling contact fatigue 68
C.2.10 Thermal cracks 68
C.2.11 Wheel tread roll-over 70
C.2.12 Damage to chamfered corner 70
C.2.13 Wheel tread - grooves and channels (or smooth edged circumferential grooves and sharp edged circumferential fluting) 71
C.2.14 False flange 72
C.2.15 Damage on the flange 74
C.2.16 Sharp-edged radial marks and radial defects on the internal face of the rim (FIJ) 75
C.2.17 Damage resulting from identification markings 76
C.2.18 Damage from lathe driving tools 77
C.2.19 Sharp-edged circumferential defects on the web or wheel centre 77
C.2.20 Sharp-edged radial defect on the web 78
C.2.21 Wheel web hole defects 78
C.2.22 Cracks in the wheel hub 79
C.3 Defects specific to wheel types 79
C.3.1 Deep sub-surface tread defect on monobloc wheels 79
C.3.2 Wheel web defects on monobloc wheels 80
C.3.3 Exceptional thermomechanical stressing in tyred wheels 82
C.4 Axle defects 82
C.4.1 Axle protection defect - Damage on the painting/coating 82
C.4.2 Corrosion 83
C.4.3 Circumferential defects 84

C.4.4 Notches and impact damage ... 86
C.4.5 Longitudinal defects ... 87
C.4.6 Damage in the interference fit zones ... 87
C.5 Axle box defects ... 88
C.6 Wheelset defects ... 89
C.6.1 General ... 89
C.6.2 Wheel distortion ... 89
C.6.3 In service axial or angular movement of a wheel or of one of the other components ... 90
C.6.4 Bent axle ... 91

Annex D (normative) Freight stock ... 92

Annex E (informative) Rim size without roll-over for equipment not subject to Directive 2008/57/EC 93

Annex F (normative) Definitions of Type A and B axles ... 94

Annex G (informative) Permissible circularity defects ... 97

Annex H (informative) Tyred wheels and resilient wheels ... 98

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

Annex I (normative) Reference images for axle surface condition limits for off vehicle wheelset maintenance ... 102

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

Annex J (informative) NDT interval ... 105

J.1 General ... 105
J.2 Axle ... 105
J.3 Wheel ... 105

Annex K (informative) Summary of the requirements of this standard for in-service boxed wheelsets ... 106

Annex L (informative) Characteristics of narrow gauge wheelsets ... 108

Annex M (informative) Characteristics of Spanish and Portuguese gauge wheelsets ... 109

Annex N (informative) Characteristics of Finnish and Baltic Country Gauge Wheelsets ... 110

Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC aimed to be covered ... 111

Bibliography ... 114