

DIN EN 13261:2010-06 (E)

Railway applications - Wheelsets and bogies - Axles - Product requirements

Contents		Page
Foreword		5
Introduction		6
1	Scope	7
2	Normative references	7
3	Product definition	8
3.1	Chemical composition	8
3.1.1	Values to be achieved	8
3.1.2	Location of sample	8
3.1.3	Chemical analysis	8
3.2	Mechanical characteristics	9
3.2.1	Characteristics from tensile test	9
3.2.2	Impact test characteristics	10
3.2.3	Fatigue characteristics	13
3.3	Microstructure characteristics	14
3.3.1	Values to be achieved	14
3.3.2	Location of the test piece	15
3.3.3	Test method	15
3.4	Material cleanliness	15
3.4.1	Micrographic cleanliness	15
3.4.2	Internal integrity	16
3.5	Permeability to ultrasound	17
3.5.1	General	17
3.5.2	Level to be achieved	17
3.5.3	Test piece	17
3.5.4	Test method	17
3.6	Residual stresses	17
3.6.1	General	17
3.6.2	Values to be achieved	18
3.6.3	Test piece and position of measurement points	18
3.6.4	Measurement method	18
3.7	Surface characteristics	18
3.7.1	Surface finish	18
3.7.2	Surface integrity	21
3.8	Geometrical and dimensional tolerances	22
3.9	Protection against corrosion and against mechanical aggression	27
3.9.1	Final protection	27
3.9.2	Temporary protection	31
3.10	Marking	31
	Annex A (normative) Particular characteristics for axles of steel grade EA1T and EA4T	33
A.1	Chemical composition	33
A.2	Mechanical characteristics	33
A.2.1	Characteristics from tensile test	33
A.2.2	Impact test characteristics	33
A.2.3	Fatigue characteristics	34
A.3	Metallographic characteristics	34

Annex B (normative) Standard wedge for measurement of permeability to ultrasound	35
B.1 Test piece	35
B.2 Tolerances of the wedge	35
B.3 Steel grade	35
Annex C (normative) Method to assess resistance to impact of the coating	36
C.1 Principle	36
C.2 Test piece	36
C.3 Apparatus	36
C.4 Procedure	36
C.5 Expression of results	36
Annex D (normative) Method to assess resistance to gritting of the coating	37
D.1 Principle	37
D.2 Test piece	37
D.3 Apparatus	37
D.4 Procedure	37
D.5 Expression of results	37
Annex E (normative) Method to assess the resistance of the coating to specific corrosive products	38
E.1 Principle	38
E.2 Test piece	38
E.3 Apparatus	38
E.4 Corrosive products	38
E.5 Procedure	38
E.6 Expression of results	39
Annex F (normative) Method to assess the resistance of the coating to cyclic mechanical stresses	40
F.1 Purpose	40
F.2 Principle	40
F.3 Test piece	40
F.4 Apparatus	40
F.5 Procedure	40
F.6 Expression of results	41
Annex G (normative) Measurement of the hydrogen content in the steel for axles at the melting stage	42
G.1 Sampling	42
G.2 Analysis methods	42
G.3 Precautions	42
Annex H (informative) Drawings of test pieces	43
Annex I (informative) Product qualification	45
I.1 Introduction	45
I.2 General	45
I.3 Requirements	45
I.3.1 Requirements to be met by the supplier	45
I.3.2 Requirements to be met by the product	46
I.4 Qualification procedure	46
I.4.1 General	46
I.4.2 Documentation required	46
I.4.3 Evaluation of the manufacturing plant and of the production processes	47
I.4.4 Laboratory tests	47

I.5	Qualification certificate	47
I.5.1	Condition of validity	47
I.5.2	Modification and extension	48
I.5.3	Transference	48
I.5.4	Lapsed certification	48
I.5.5	Cancellation	48
I.6	Qualification file	48
Annex J (informative) Product delivery		49
J.1	Introduction	49
J.2	General	49
J.3	Delivery condition	50
J.4	Controls on each axle	50
J.5	Batch control	50
J.5.1	Controls	50
J.5.2	Permeability to ultrasound	51
J.5.3	Surface finish	52
J.5.4	Visual examination	52
J.6	Quality plan	52
J.6.1	General	52
J.6.2	Purpose	52
J.6.3	Application of the quality plan	52
J.7	Allowable rectification	53
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of Council Directive 96/48/EC of 23 July 1996 on the interoperability of the trans-European high-speed rail system amended by Directive 2004/50/EC of 29 April 2004		54
Annex ZB (informative) Relationship between this European Standard and the Essential Requirements of Directive 2001/16/EC of the European Parliament and of the Council of 19 March 2001 on the interoperability of the trans-European conventional rail system amended by Directive 2004/50/EC of 29 April 2004		55
Bibliography		57