

# DIN EN 15273-3:2017-10 (E)

## Railway applications - Gauges - Part 3: Structure gauges (includes Amendment A1:2016)

---

<b>Contents</b>		<b>Page</b>
European foreword .....		9
Introduction .....		10
<b>1</b>	<b>Scope .....</b>	<b>11</b>
<b>2</b>	<b>Normative references .....</b>	<b>12</b>
<b>3</b>	<b>Terms and definitions .....</b>	<b>12</b>
3.1	structure gauge .....	12
3.1.1	structure verification limit gauge .....	12
3.1.2	structure installation limit gauge .....	12
3.1.3	structure installation nominal gauge .....	13
3.2	distance between track centres .....	13
3.2.1	verification limit distance between centres .....	13
3.2.2	installation limit distance between centres .....	13
3.2.3	installation nominal distance between centres .....	14
<b>4</b>	<b>Symbols, abbreviations and subscripts .....</b>	<b>15</b>
4.1	Symbols and abbreviations .....	15
4.2	Subscripts .....	21
4.3	Notations .....	21
<b>5</b>	<b>General information on all the gauging methods .....</b>	<b>22</b>
5.1	The reference profile and its associated rules .....	22
5.2	Transverse widening .....	22
5.2.1	Gauge variations depending on the local situation .....	22
5.2.2	Random transverse phenomena .....	23
5.3	Superelevation and lowering perpendicular to the running surface .....	24
5.3.1	General .....	24
5.3.2	Vertical superelevation or lowering for longitudinal profile transition curves .....	24
5.3.3	Vertical effect of the roll .....	25
5.3.4	Uplift .....	27
5.3.5	Vertical random phenomena .....	27
5.4	Additional allowances .....	27
5.5	Gauge types .....	27
5.5.1	Gauge methodologies .....	27
5.5.2	Structure gauge types .....	28
5.5.3	Uniform gauge .....	28
5.6	Choice of gauge .....	29
5.6.1	Gauge and methodology choice .....	29
5.6.2	Structure gauge choice .....	29
5.6.3	Taking account of the allowances .....	29
5.6.4	Catalogue of gauges .....	30
<b>6</b>	<b>Rules for determination of the static gauge .....</b>	<b>30</b>
6.1	General .....	30
6.2	Associated rules .....	30
6.3	Transverse clearances .....	32
6.3.1	Phenomena considered .....	32
6.3.2	Determination of the sum of allowances j .....	32

6.4	Vertical allowances for random phenomena .....	33
6.4.1	Phenomena considered .....	33
6.4.2	Determination of the sum of vertical allowances V .....	33
7	Rules for determination of the kinematic gauge .....	33
7.1	General .....	33
7.2	Associated rules .....	34
7.3	Transverse allowances for random phenomena .....	35
7.3.1	Phenomena considered .....	35
7.3.2	Determination of the sum of transverse allowances j .....	35
7.4	Vertical allowances for random phenomena .....	36
7.4.1	Phenomena considered .....	36
7.4.2	Determination of the sum of vertical allowances V .....	36
8	Rules for determination of the dynamic gauge .....	36
8.1	General .....	36
8.2	Associated rules .....	37
8.3	Transverse allowances for random phenomena .....	37
8.3.1	Phenomena considered .....	37
8.3.2	Determination of the sum of allowances j .....	38
8.4	Vertical allowances for random phenomena .....	38
8.4.1	Phenomena considered .....	38
8.4.2	Determination of the sum of vertical allowances V .....	38
9	Distance between track centres .....	39
9.1	General .....	39
9.2	Determination of the limit distance between track centres .....	39
9.2.1	General .....	39
9.2.2	Effect of cant difference bD .....	40
9.2.3	Allowances to take into account random phenomena .....	41
9.2.4	Determination .....	42
9.3	Determination of the nominal distance between track centres .....	43
9.3.1	General .....	43
9.3.2	Determination .....	43
10	Elements of variable layout .....	43
10.1	General .....	43
10.1.1	Calculation principle .....	43
10.1.2	Characteristics of a layout transition .....	44
10.1.3	Gauge variations .....	44
10.2	Layout transition .....	45
10.2.1	Sudden change of curvature .....	45
10.2.2	Smooth transition of curvature .....	46
10.3	Crossing of a switch or crossing .....	47
10.3.1	General .....	47
10.3.2	Additional overthrow variations .....	48
10.3.3	Quasi-static effect variations .....	49
10.3.4	Result .....	49
11	Determination of the pantograph free passage gauge .....	49
11.1	General .....	49
11.1.1	Space to be cleared for electrified lines .....	49
11.1.2	Particularities .....	50
11.1.3	Basic principles .....	50
11.2	Determination of the pantograph free passage mechanical gauge (in the case of the kinematic gauge) .....	51
11.2.1	Determination of the mechanical gauge width .....	51
11.2.2	Determination of the maximum height heff of the mechanical gauge .....	53
11.3	Pantograph electrical gauge (in the case of the kinematic gauge) .....	54
11.3.1	General .....	54
11.3.2	Pantograph electrical gauge width .....	54
11.3.3	Electrical gauge height .....	54

11.3.4	Insulating distance .....	55
11.4	Determination of the pantograph gauge in the case of the dynamic gauge .....	55
12	Overhead contact wire .....	55
13	Rules for installation of platform edges .....	56
13.1	General .....	56
13.2	Gap h <sub>lac</sub> 0 and h <sub>lac</sub> 0 .....	59
13.3	Installation dimensions .....	61
13.3.1	Installation relative to the running surface .....	61
13.3.2	Installation relative to the horizontal (x <sub>q</sub> , y <sub>q</sub> ) .....	61
13.3.3	Installation tolerances .....	62
13.4	Verification and tolerances .....	62
14	Tilting trains .....	62
14.1	General .....	62
14.2	Transition curve .....	63
14.3	Degraded modes .....	64
15	Rules for ferries .....	64
16	Track accessories .....	64
16.1	General .....	64
16.2	Contact ramps .....	65
16.3	Active check rails .....	65
16.4	Planking of level crossings .....	65
16.5	Electric third rail .....	65
16.6	Rail brakes .....	65
17	Verification and maintenance of the gauge .....	66
17.1	Structure gauges .....	66
17.2	Distance between track centres .....	66
18	Guide for determination of a new gauge from an existing infrastructure .....	66
<b>Annex A (normative) Calculation methodology for structure gauge allowances .....</b>		<b>67</b>
A.1	General .....	67
A.2	Formulation in the case of the kinematic gauge .....	67
A.2.1	For the installation nominal gauge .....	67
A.2.2	For the installation limit gauge .....	68
A.2.3	For the verification limit gauge .....	70
A.2.4	For the installation nominal distance between centres .....	71
A.2.5	For the installation limit distance between centres .....	71
A.2.6	For the verification limit distance between centres .....	71
A.2.7	For the pantograph gauge .....	72
A.3	Formulation in the case of the dynamic gauge .....	72
A.3.1	General .....	72
A.3.2	For the installation nominal gauge .....	72
A.3.3	For the installation limit gauge .....	73
A.3.4	For the verification limit gauge .....	74
A.3.5	For the nominal installation distance between centres .....	75
A.3.6	For the verification limit distance between centres .....	75
A.3.7	For the pantograph gauge .....	75
<b>Annex B (informative) Recommended values for calculation of the structure gauge and calculation examples .....</b>		<b>76</b>
B.1	Recommendations for coefficients .....	76
B.2	Examples of kinematic calculation .....	78
B.2.1	Verification limit gauge, installation limit gauge and installation nominal gauge .....	78
B.2.2	Nominal, installation limit and verification limit distances between centres .....	80

<b>Annex C (normative) International gauges G1, GA, GB and GC, GI1, GI2 and GI3 .....</b>	<b>81</b>	
C.1	General .....	81
C.1.1	Application .....	81
C.1.2	Gauge types .....	81
C.1.3	Parameters and common rules .....	81
C.1.4	Calculation of distance between centres .....	82
C.1.5	Pantograph free passage gauge .....	82
C.1.6	Gauge parts .....	82
C.2	Gauge for the upper parts (h > 400 mm) .....	83
C.2.1	Gauge G1 .....	83
C.2.2	Gauges GA and GB .....	84
C.2.3	Gauge GC .....	86
C.3	Lower parts (h 0,400 m) .....	87
C.3.1	Lower parts of GI2 - generally applicable .....	87
C.3.2	Lower parts of GI1 - Tracks for rail brake equipment .....	88
C.3.3	Lower parts for "rolling" roads - GI3 .....	93
C.4	Pantograph free passage gauge .....	95
<b>Annex D (normative) Gauges for multilateral and national agreements .....</b>	<b>96</b>	
D.1	General .....	96
D.2	Kinematic gauges derived from international gauges .....	96
D.2.1	Gauge G2 .....	96
D.2.2	Gauges GB1 and GB2 .....	98
D.3	Static gauges derived from international gauges .....	100
D.3.1	Gauge G1 .....	100
D.3.2	Gauge G2 .....	104
D.3.3	Static gauges GA, GB and GC (loading gauges) .....	105
D.4	National application gauge .....	108
D.4.1	Belgian gauges BE1, BE2 and BE3 .....	108
D.4.2	French gauges FR-3.3 .....	112
D.4.3	Portuguese gauges PTb, PTb+ and PTc .....	114
D.4.4	Finnish gauge FIN1 .....	120
D.4.5	Swedish gauges SEa and SEc .....	123
D.4.6	German gauge DE1 .....	126
D.4.7	German gauge DE2 .....	128
D.4.8	German gauge DE3 .....	129
D.4.9	Czech gauge Z-GCD .....	131
D.4.10	British gauge .....	132
D.4.11	Spanish gauges GHE16, GEA16, GEB16, GEC16, GEC14, GEE10 and GED10 .....	133
<b>Annex E (informative) Calculation example for determination of the gauge at a switch or crossing</b>	<b>149</b>	
E.1	General .....	149
E.2	Methodology .....	150
E.3	Widening in the curve .....	150
E.3.1	Widening of the main line .....	150
E.3.2	Widening in the turnout route .....	152
E.4	The quasi-static effect .....	153
E.5	Gauge widening at a switch or crossing .....	154
<b>Annex F (normative) Determination of reference vehicle characteristics .....</b>	<b>157</b>	
F.1	General .....	157
F.2	Methodology .....	157
F.3	Calculation example .....	158
F.3.1	General .....	158
F.3.2	Vehicle no. 1 (on the inside of the curve) .....	158
F.3.3	Vehicle no. 2 (on the outside of the curve) .....	158
F.3.4	Vehicle no. 3 (on the inside of the curve) .....	159

F.3.5	Vehicle no. 4 (on the outside of the curve) .....	159
F.3.6	Summary .....	159
F.3.7	International gauge reference vehicles .....	160
<b>Annex G (normative) Uniform gauge .....</b>		<b>162</b>
G.1	General .....	162
G.2	GU1 .....	162
G.2.1	General .....	162
G.2.2	Determination of the gauge .....	162
G.2.3	Equivalent kinematic gauge .....	164
G.3	GU2 .....	164
G.3.1	General .....	164
G.3.2	Determination of the gauge .....	165
G.4	GUC .....	166
G.4.1	General .....	166
G.4.2	Determination of the gauge .....	167
<b>Annex H (informative) Gauge maintenance guideline .....</b>		<b>168</b>
H.1	General .....	168
H.2	Choice of gauge .....	168
H.3	Installation rules .....	168
H.3.1	Guidelines for installation of equipment along the track .....	168
H.3.2	Guidelines for the installation of tracks alongside structures .....	168
H.3.3	Guidelines for the installation of temporary structures .....	169
H.4	Managing and checking of structures .....	169
H.4.1	Management principles .....	169
H.4.2	Management of critical situations .....	169
H.4.3	Practical aspects for measuring the structures .....	169
H.5	Effect of track maintenance .....	170
H.6	Personnel training .....	170
<b>Annex I (informative) A-deviations .....</b>		<b>171</b>
<b>Annexe ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC .....</b>		<b>173</b>
<b>Bibliography .....</b>		<b>177</b>