

DIN EN 15551:2011-01 (E)

Railway applications - Railway rolling stock - Buffers (includes Amendment A1:2010)

Contents	Page
Foreword.....	5
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Classification and designation.....	10
4.1 General.....	10
4.2 Buffers with buffer stroke 105 mm (Categories A, B and C)	10
4.3 Buffers with buffer stroke 110 mm.....	10
4.4 Long stroke buffer 150 mm.....	10
4.5 Interaction coupling/buffer	11
5 Requirements	11
5.1 General.....	11
5.2 Fixing on vehicle and interchangeability	11
5.3 Buffer dimensions	12
5.4 Mechanical characteristics of buffers	13
5.5 Elastic devices	15
5.5.1 Types of elastic devices.....	15
5.5.2 Static characteristics.....	15
5.5.3 Dynamic characteristics	16
5.5.4 Endurance testing under service load for elastic device	16
5.5.5 Endurance testing for life-cycle simulation	16
5.6 Marking	16
6 Housing.....	18
6.1 Plunger and base	18
6.2 Buffer head	18
6.2.1 Materials	18
6.2.2 Boundary dimensions	18
6.2.3 Standard dimensions of buffer head	19
7 Crashworthy buffers for tank wagons according to RID.....	20
Annex A (normative) Maximum space envelope of buffer.....	21
A.1 Requirements for space envelope of buffer	21
A.1.1 Buffers for freight wagons.....	21
A.1.2 Buffers for coaches	24
A.2 Notes on definition of envelopes for overall dimensions of wagon buffers described in Annex A	24
A.2.1 General.....	24
A.2.2 Study relating to definition of the envelope.....	25
Annex B (normative) Mechanical characteristics of buffers - Test methods.....	27
B.1 General.....	27
B.2 Force F1	27
B.3 Force F2	27
B.4 Force F3	27
B.5 Force F4	28
B.6 Force F5	28
B.7 Force F6	28

	Page
Annex C (normative) Requirements for elastic devices	29
C.1 Rubber elastomer or other elastomer elastic systems	29
C.1.1 General	29
C.1.2 Metal inserts	29
C.1.3 Constituents of rubber elastomer and/or other elastomer systems	29
C.1.4 Static characteristics of the sets	31
C.1.5 Dynamic characteristics of the sets	31
C.1.6 Bonding	31
C.1.7 Marking	31
C.1.8 Inspection and tests	31
C.2 Friction spring/Ring spring	32
C.2.1 Manufacturer's marks	32
C.2.2 Flexibility test	33
C.2.3 Endurance test	34
C.3 Hydrodynamic or hydrostatic systems	34
C.3.1 General	34
C.3.2 Steel parts	34
C.3.3 Absorbing energy medium	34
C.3.4 Static tests of capsules	35
C.4 Combined elastic systems	35
Annex D (normative) Testing of static characteristics of buffers	36
D.1 Test principle	36
D.2 Test procedure	36
D.3 Measurements	36
Annex E (normative) Dynamic testing	37
E.1 Dynamic testing of buffer	37
E.1.1 General	37
E.1.2 Temperature effects	38
E.2 Dynamic characteristics of 105 mm stroke buffer	39
E.2.1 Test programme	39
E.2.2 Category A	40
E.2.3 Category B	40
E.2.4 Category C	41
E.2.5 Comments on the test conditions	41
E.3 Dynamic characteristics of 150 mm stroke buffer	42
E.4 Dynamic characteristics of 110 mm stroke buffer	43
Annex F (normative) Endurance testing under service load for elastic device	44
F.1 Aim of the test	44
F.2 Test principle	44
F.3 Test results to be obtained	45
F.4 Test requirements	45
F.4.1 Endurance test assembly	45
F.4.2 Preliminary static test	46
F.4.3 Endurance test	46
F.4.4 Final static test	46
Annex G (normative) Endurance testing under buffing load for life-cycle simulation	47
G.1 Endurance tests for hydrodynamic and hydrostatic buffers for wagons	47
G.1.1 Aim of the test	47
G.1.2 Test principle	47
G.1.3 Expected result	47
G.1.4 Test requirements	47
G.1.5 Delivery of elastic devices	50
G.2 Endurance tests for hydrodynamic and hydrostatic buffers for coaches	50
G.2.1 General	50
G.2.2 Tests under alternating loads	50
G.2.3 Repeated buffing tests	51
G.2.4 Conditions to be observed	51

	Page
Annex H (normative) Plunger and base	52
H.1 Plunger and base	52
H.2 Manufacture of housing	52
H.2.1 Welding	52
H.2.2 Initial greasing	52
Annex I (informative) Guidelines for buffer head materials	53
I.1 Example of test program requirements for verification of buffer head materials	53
I.2 List of existing buffer head materials	55
Annex J (normative) Calculation of the width of buffer heads	56
J.1 General	56
J.2 Data used in the calculation	56
J.3 Calculation	56
Annex K (informative) Regulations relating to the layout of S-curves	58
K.1 Data used in the calculation	58
K.2 Equations to be applied	58
K.3 Working examples	59
K.4 Comments on the preparation of the equations in Annex J and Annex K	60
K.5 Track	60
K.6 Vehicle	60
Annex L (normative) Crashworthy buffers for tank wagons according to RID	61
L.1 Requirements on crashworthy buffers	61
L.1.1 Objectives from RID	61
L.1.2 Additional requirements	61
L.2 Test procedure for crashworthy buffers	61
Annex M (normative) Maximum space envelope of crashworthy buffers	63
Annex ZA (informative) A1 Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community (Recast) A1	66
A1 deleted text A1	
Bibliography	71