DIN EN 15551:2022-10 (E)

Railway applications - Railway rolling stock - Buffers

Contents

Page

European foreword 6

Introduction 8

1 Scope 9

2 Normative references 9

3 Terms and definitions 11

4 Classification and designation 14
4.1 General 14
4.2 Buffers with buffer stroke 105 mm (Categories A, B and C) 14
4.3 Buffers with buffer stroke 110 mm 14
4.4 Long stroke buffer 150 mm 14
4.5 Crashworthy Buffers 14

5 Requirements 15
5.1 General 15
5.2 Fixing on vehicle and interchangeability 15
5.3 Buffer dimensions 17
5.4 Mechanical characteristics of buffers 17
5.5 Elastic systems 20
5.5.1 Types of elastic systems 20
5.5.2 Static characteristics 20
5.5.3 Dynamic characteristics 22
5.6 Marking 22

6 Housing 24
6.1 Plunger and base 24
6.2 Buffer head 24
6.2.1 Materials 24
6.2.2 Standard dimensions of buffer head 24
6.3 Type and series tests 25

7 Crashworthy buffers 26
7.1 On wagons 26
7.2 On other vehicles 26

Annex A (normative) Maximum space envelope of buffer 27

A.1 Requirements for space envelope of buffer 27
A.1.1 Buffers for freight wagons 27
A.1.2 Buffers for coaches 30
A.2 Notes on the definition envelopes for overall dimensions of Buffers for freight wagons 31
A.2.1 General 31
A.2.2 Study relating to definition of the envelope 32

Annex B (normative) Mechanical characteristics of buffers - Test methods 34

B.1 General 34
B.2 Test methodology 34

B.2.1 General 34
B.2.2 Force F1 35
B.2.3 Force F2 35
B.2.4 Force F3 35
B.2.5 Force F4 35
B.2.6 Force F5 35
B.2.7 Force F6 36
B.3 Test documentation 36

Annex C (normative) Requirements for elastic systems 38

C.1 Rubber elastomer or other elastomer elastic systems 38
C.1.1 General 38
C.1.2 Metal inserts 38
C.1.3 Constituents of rubber elastomer and/ or elastomer systems 38
C.1.4 Static characteristics of the spring sets 40
C.1.5 Dynamic characteristics of the spring sets 40
C.1.6 Bonding 40
C.1.7 Marking 40
C.1.8 Inspection and tests 40
C.2 Friction spring/ ring spring 42
C.2.1 Manufacturer's marks 42
C.2.2 Flexibility test 42
C.2.3 Endurance test 43
C.2.4 Static characteristics for friction spring/ ring spring 43
C.2.5 Dynamic characteristics for friction spring/ ring spring 43
C.3 Hydrodynamic or hydrostatic systems 43
C.3.1 General 43
C.3.2 Absorbing energy medium 44
C.3.3 Static test of capsules 44
C.4 Combined elastic systems 45

Annex D (normative) Testing of static characteristics of buffers 46

D.1 Test principle 46
D.2 Test procedure 46
D.3 Measurements 46

Annex E (normative) Dynamic testing 47

E.1 Dynamic testing of buffer 47
E.1.1 General 47
E.1.2 Temperature effects 49
E.2 Dynamic characteristics of 105 mm stroke buffer 49
E.2.1 Test programme 49
E.2.2 Tests for Category A to C 51
E.2.3 Summary of Tests on Category A to C 53
E.2.4 Comments on the test conditions 54
E.3 Dynamic characteristics of 150 mm stroke buffer 54
E.3.1 General 54
E.3.2 Comments on test conditions 55
E.4 Dynamic characteristics of 110 mm stroke buffers 55

Annex F (normative) Endurance testing under service load for elastic system 57

F.1 Aim of the test 57
F.2 Test principle 57
F.3 Test results to be obtained 57
F.4 Test procedure 58
F.4.1 Endurance test assembly 58
F.4.2 Preliminary test 58
F.4.3 Endurance test 59

F.4.4 Final static test 59

Annex G (normative) Endurance testing under buffing load for life cycle simulation 60

G.1 Endurance tests for elastic systems for freight wagons 60
G.1.1 Aim of the test 60
G.1.2 Test principle 60
G.1.3 Test results to be obtained 60
G.1.4 Test procedure 60
G.1.5 Delivery of elastic systems 62
G.2 Endurance test for elastic system for coaches 63
G.2.1 General 63
G.2.2 Tests under alternating loads 63
G.2.3 Repeated buffing tests 64
G.2.4 Conditions to be observed 64

Annex H (informative) Guidelines for buffer head materials 65

H.1 Example of test programme requirements for verification of buffer head materials 65
H.2 Buffer head materials 66

Annex I (normative) Crashworthy buffers for tank wagons 68

I.1 Requirements for crashworthy buffers 68
I.1.1 Objectives 68
I.1.2 Additional requirements 68
I.2 Test procedure for crashworthy buffers 68

Annex J (normative) Maximum space envelope of crashworthy buffers 70

Annex ZA (informative) Relationship between this European Standard and the Essential requirements of EU Directive 2016/797/EC aimed to be covered 73

Bibliography 75