DIN EN 45545-2:2016-02 (E)

Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behaviour of materi als and components (includes Amendment A1:2015)

Contents

Page

European foreword 5

Introduction 6

1 Scope 7

2 Normative references 7

3 Terms and definitions 9

4 Requirements 9
4.1 Essential fire safety objectives 9
4.2 General 9
4.3 Grouping rules 11
4.3.1 General 11
4.3.2 Rule 1 11
4.3.3 Rule 2 11
4.3.4 Rule 3 11
4.4 Listed products 13
4.5 Non-listed products 19
4.6 Refurbishment and maintenance requirements 20
4.6.1 General 20
4.6.2 Requirements for refurbishment of passenger seats 20
4.7 Products to be approved on functional necessity 21
4.8 Set of material requirements 21

5 Test properties 29
5.1 Summary of test methods 29
5.2 Modifications on test methods used in 5.1 34
5.2.1 Definitions 34
5.2.2 Furnishing products burning behaviour 34
5.3 Testing rules 35
5.3.1 Products or assemblies 35
5.3.2 Hoses or Pipes 35
5.3.3 Substrates for surface products 36
5.3.4 Test specimen preparation for upholstery products 36
5.3.5 Linear cable containment products 36
5.3.6 Fire integrity testing 37
5.3.7 Assessment for burning droplets / particles 38

6 Evaluation of conformity 38

Annex A (normative) Standard vandalism test for seat coverings 39

A.1 Introduction 39
A.2 Apparatus 39
A.3 Preparation of test specimen 40
A.4 Test procedure 40
A.4.1 Number of tests 40
A.4.2 Setting up the apparatus 40
A.4.3 Preparing and fitting of the test specimen 40

A.4.4 Penetration and laceration tests 40
A.5 Results 40
A.6 Test report 41

Annex B (normative) Fire test method for seating 42

B.1 General 42
B.2 Safety warning 42
B.3 Test facility 42
B.3.1 Hood and smoke exhaust system 42
B.3.2 Ignition source "EN 45545 square burner" 44
B.3.3 Other general equipment 48
B.4 Test specimens 49
B.4.1 General 49
B.4.2 Number of tests 49
B.4.3 Preparation of the test specimen 49
B.4.4 Conditioning of test specimen 50
B.5 Test procedure and application of the burner 50
B.6 Early termination of test 52
B.7 Test results 52
B.8 Test report 52

Annex C (normative) Testing methods for determination of toxic gases from railway products 54

C.1 Introduction 54
C.2 Method 1 - Test apparatus 56
C.2.1 General 56
C.2.2 Calibration of the radiating cone 56
C.2.3 Smoke chamber - Smoke density 56
C.3 Analysis of fire effluents for Method 1 56
C.3.1 Principles of FTIR gas analysis used in a discontinuous way 56
C.3.2 Probe for sampling of effluents 57
C.3.3 FTIR gas cell 57
C.3.4 FTIR spectrometer 57
C.4 Test environment 58
C.5 Conditioning 58
C.6 Pre-test conditions for the apparatus for Method 1 58
C.7 Warnings 58
C.8 Smoke and gas testing using Method 1 59
C.8.1 Beginning of the test 59
C.8.2 Test procedure 59
C.8.3 End of test 60
C.8.4 Data acquisition 60
C.9 Data treatment 61
C.10 Test report for Method 1 61
C.11 Use of alternative gas analysis techniques to FTIR 63
C.12 Method 2 - Test apparatus 64
C.13 Test environment (Method 2) 64
C.14 Conditioning of samples 64
C.15 Test for gases using Method 2 64
C.16 Calculations of CIT 65
C.16.1 Introduction 65
C.16.2 General products (CITG) 65
C.16.3 Non-listed products (CITNLP) 65

Annex D (normative) Protocol for test specimen preparation in standard tests 67

D.1 Protocol for specimen preparation for tests according to EN ISO 5659-2 and ISO 5660-1 . 67
D.2 Protocol for specimen preparation of upholstered furniture assembled products for tests according to EN ISO 5659-2 and ISO 5660-1 67
D.2.1 Scope and field of application 67
D.2.2 Preparation of test specimens 67

D.2.2.1 General **67**
D.2.2.2 Test specimen preparation **68**
D.2.2.3 Reporting of Mass **68**
D.3 Protocol for test specimen preparation for flame spread testing **68**
D.3.1 Scope and field of application **68**
D.3.2 Test specimen preparation **68**
Annex ZA (informative) **Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC** **70**
Bibliography **73**