DIN EN 13964:2014-08 (E)

Suspended ceilings - Requirements and test methods

Contents

Page

Foreword 6

Introduction 7

1 Scope 8

2 Normative references 9

3 Terms and definitions 12
3.1 General 12
3.2 Suspended ceiling and substructure components (see Figure 1) 13
3.2.1 General 13
3.2.2 Fixing, connections and supports 14
3.3 Ceiling membranes and ceiling membrane components 14
3.4 Typical suspended ceiling systems using volume or thin gauge materials 16

4 Requirements 20
4.1 Dimensions and tolerances - General 20
4.2 Modular dimensions 20
4.3 Mechanical resistance and stability of load bearing components 29
4.3.1 General 29
4.3.2 Substructure 29
4.3.3 Suspension components and fasteners 31
4.3.4 Resistance to fixings 31
4.3.5 Wind load resistance 31
4.3.6 Impact resistance 31
4.3.7 Seismic resistance 31
4.4 Safety in case of fire 32
4.4.1 Fire resistance 32
4.4.2 Reaction to fire 32
4.5 Hygiene, health and environment - Toxic gases and dangerous substances 33
4.5.1 Release of Asbestos (content) 33
4.5.2 Release and/or content of formaldehyde 34
4.5.3 Other dangerous substances 34
4.5.4 Susceptibility to the growth of harmful micro-organisms 34
4.6 Safety in use 34
4.6.1 Shatter properties 34
4.6.2 Flexural tensile strength 35
4.6.3 Mechanical strength, safety against failure - baffles 35
4.6.4 Electrical safety 35
4.7 Acoustics 35
4.7.1 Test specimen preparation 35
4.7.2 Sound absorption 35
4.7.3 Sound insulation 36
4.7.4 Direct field of application 36
4.8 Durability 36
4.8.1 General 36
4.8.2 Dampness 36
4.8.3 Service life requirements 37
4.8.4 Classification of ceiling exposure conditions 37
4.8.5 Corrosion protection 37
4.8.6 Contact corrosion protection 38

4.8.7 Durability of non-cellular PVC profiles ... 38
4.8.8 Durability of wooden products ... 39
4.9 Colour, light reflectance and gloss factor for suspended ceiling components ... 39
4.9.1 General ... 39
4.9.2 Measurement method of colour composition ... 39
4.9.3 Measurement method for light reflectance ... 39
4.9.4 Measurement and value of gloss factor ... 39
4.10 Thermal insulation ... 39

5 Loading capacity of substructures components - Test methods ... 39
5.1 General ... 39
5.2 Bending test of metal substructure profiles ... 40
5.2.1 General ... 40
5.2.2 Procedure for testing ... 40
5.2.3 Assessment of results ... 41
5.2.4 Test report ... 42
5.3 Testing of metal suspension and connecting components ... 43
5.3.1 General ... 43
5.3.2 Static test ... 47
5.3.3 Functional test ... 48
5.3.4 Assessment of test results (static test) ... 48
5.3.5 Test report ... 48
5.4 Acceptance factor k ... 49

6 Evaluation of conformity ... 50
6.1 General ... 50
6.2 Initial type testing ... 50
6.3 Factory production control (FPC) ... 51
6.3.1 General ... 51
6.3.2 General requirements ... 51
6.3.3 Product specific requirements ... 51
6.3.4 Initial inspection of factory and of FPC ... 55
6.3.5 Continuous surveillance of FPC ... 56
6.3.6 Procedure for modifications ... 56

7 Marking, labelling and packaging ... 56
7.1 Marking and labelling ... 56
7.2 Packaging ... 56

8 Technical documentation ... 56

Annex A (informative) Guidance for installation ... 57

A.1 Introduction ... 57
A.2 Manufacturer's instructions ... 57
A.3 Site conditions ... 58
A.4 Supply and storage of materials ... 58
A.5 Measurement and maximum deviations ... 58
A.5.1 Level mark ... 58
A.5.2 Flatness ... 58
A.5.3 Squareness ... 58
A.5.4 Alignment of linear components ... 58
A.5.5 Cut to size membrane components ... 58
A.5.6 Fire resistant ceilings ... 59
A.5.7 Top fixing and perimeter trim fixing ... 59
A.6 Mechanical resistance and stability of load bearing components ... 59

Annex B (informative) Selection of top fixing and perimeter trim fixing ... 61

Annex C (informative) Wind load resistance ... 63

Annex D (normative) Impact resistance ... 64

D.1 Scope 64
D.2 Definitions 64
D.3 Test apparatus 64
D.3.1 Balls 64
D.3.2 Ball gun 64
D.4 Mounting of structural elements 65
D.5 Test procedure 65
D.5.1 General 65
D.5.2 Calibration of the ball gun apparatus 66
D.5.3 Testing of ceiling elements 66
D.6 Evaluation 66
D.7 Test report 66

Annex E (normative) Formaldehyde classes and associated test methods 68

Annex F (normative) Membrane components - Flexural tensile strength test 70

F.1 General 70
F.2 Test equipment 70
F.2.1 General 70
F.2.2 Test frame 70
F.2.3 Loading equipment 71
F.2.4 Test room/chamber 72
F.2.5 Balance 72
F.3 Test conditions 72
F.3.1 Environmental conditions 72
F.3.2 Restraints/boundary conditions 72
F.4 Test specimen 73
F.4.1 Size and characteristics 73
F.4.2 Number of specimens 73
F.4.3 Conditioning 73
F.5 Test procedure 73
F.5.1 Types of loading of the specimen 73
F.5.2 General 73
F.5.3 Test without loading (minimum normative requirement) 73
F.5.4 Test with additional load 74
F.6 Test report 75
F.7 Extended field of application 76

Annex G (normative) Suspension component - Functional test 77

Annex H (normative) Perimeter trim component- Functional test, determination of load bearing capacity 80

H.1 General 80
H.2 Basic test for perimeter trims 80
H.2.1 Test installation 80
H.2.2 Fixing the perimeter trims 81
H.2.3 Test load 81
H.2.4 Number of tests 82
H.2.5 Application of the load 82
H.2.6 Perimeter trim thickness 83
H.2.7 Alternative testing 83
H.2.8 Test report 83

Annex I (normative) Reaction to fire test - Mounting and fixing 85

I.1 Dimensions of the test rig in accordance with EN 13823 85
I.2 Ceiling membrane components 85
I.2.1 Mounting and fixing in accordance with EN 13823 85
I.2.2 End use application rules 92

I.3 Substructure components ... 92
I.3.1 General ... 92
I.3.2 Mounting and fixing in accordance with EN 13823 ... 93
I.3.3 End use application rules ... 94
I.4 Reaction to fire requirements for small products and components ... 95
I.4.1 Principles ... 95
I.4.2 Small kit components ... 95
I.4.3 Small constituents ... 95
I.4.4 Linear joint kit components ... 96
I.4.5 Embedded constituents ... 96
I.4.6 Provisions accompanying performance declarations ... 96

Annex J (normative) Mechanical strength, safety against failure - baffles ... 97

J.1 General ... 97
J.2 Test equipment ... 97
J.2.1 Loading brackets ... 97
J.2.2 Conditioning chamber ... 97
J.2.3 Loading device ... 97
J.3 Test specimen ... 97
J.4 Number of specimen ... 97
J.5 Conditioning ... 97
J.6 Test set up (see Figure J.1) ... 98
J.7 Test procedure ... 99
J.8 Performance criteria, assessment, evaluation and expression of the test result ... 100
J.9 Test report ... 100

Annex K (informative) Reaction to fire performance - Classified without the need for further testing (CWFT) ... 101

Annex L (informative) Guidance on the choice of attestation of conformity system ... 102

Annex M (informative) Significant technical changes between this European Standard and the previous edition ... 105

Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives ... 106

ZA.1 Scope and relevant clauses ... 106

ZA.2 Procedure for attestation of conformity ... 111

ZA.2.1 Systems of attestation of conformity ... 111

ZA.2.2 EC certificate of conformity and EC declaration of conformity ... 117

ZA.3 CE marking ... 119

ZA.3.1 General ... 119

according also to (an)other harmonized technical specification(s) ... 126

Bibliography ... 128