DIN EN 115-1:2018-01 (Englisc h)

Safety of escalators and moving walks - Part 1: Construction and installation

Contents

Page

European foreword 6

Introduction 8

1 Scope 10

2 Normative references 10

3 Terms and definitions, symbols and abbreviations 12
3.1 Terms and definitions 12
3.2 Symbols and abbreviations 15

4 List of significant hazards 17
4.1 General 17
4.2 Mechanical hazards 17
4.3 Electric hazards 18
4.4 Radiation hazards 18
4.4.1 Electromagnetic radiation generated by the machine 18
4.4.2 Electromagnetic radiation received from outside 18
4.5 Fire hazard 18
4.6 Hazards generated by neglecting ergonomic principles in machinery design 18
4.7 Hazard generated by failure of control circuit 18
4.8 Hazards generated by break-up during operation 19
4.9 Slipping, tripping and falling hazards 19
4.10 Hazards specific for this type of machine 19
4.11 Significant hazards due to seismic events 20

5 Safety requirements and/or protective measures 20
5.1 General 20
5.2 Supporting structure (truss) and enclosure 20
5.2.1 General 20
5.2.2 Angle of inclination 21
5.2.3 Access to the interior 21
5.2.4 Inspection covers 21
5.2.5 Structural design 21
5.3 Steps, pallets, belt 21
5.3.1 General 21
5.3.2 Dimensions 22
5.3.3 Structural design 22
5.3.4 Guiding of steps, pallets and belt 27
5.3.5 Clearance between steps or pallets 27
5.3.6 Missing step or pallet device 27
5.4 Drive unit 27
5.4.1 Driving machine 27
5.4.2 Braking system 28
5.4.3 Steps and pallets drive 31
5.4.4 Belt drive 32
5.5 Balustrade 32
5.5.1 General 32
5.5.2 Dimensions of balustrade 32
5.5.3 Skirting 33
5.5.4 Newel 36

5.5.5 Clearance between steps, pallets or belt and skirting ... 36
5.6 Handrail system ... 37
5.6.1 General ... 37
5.6.2 Profile and position ... 37
5.6.3 Distance between the handrail centre lines ... 37
5.6.4 Handrail entry ... 37
5.6.5 Guiding ... 37
5.7 Landings ... 38
5.7.1 Surface properties ... 38
5.7.2 Configuration of steps, pallets and belts ... 38
5.7.3 Combs ... 39
5.8 Machinery spaces, driving station and return stations ... 39
5.8.1 General ... 39
5.8.2 Dimensions and equipment ... 40
5.8.3 Lighting and socket outlets ... 40
5.9 Fire protection ... 41
5.10 Transportation ... 41
5.11 Electric installations and appliances ... 48
5.11.1 General ... 48
5.11.2 Contactors, relay contactors, components of failsafe circuits ... 49
5.11.3 Main switches ... 50
5.11.4 Electric wiring ... 50
5.12 Electric control system ... 51
5.12.1 Protective devices and functions ... 51
5.12.2 Safety devices and functions ... 53
5.12.3 Control devices and functions ... 61

6 Verification of the safety requirements and/or protective measures ... 67
6.1 General ... 67
6.2 Specific data, test reports and certificates ... 71

7 Information for use ... 72
7.1 General ... 72
7.2 Signals and warning devices ... 72
7.2.1 Plates, inscriptions and notices for use ... 72
7.2.2 Special indicators for escalators and moving walks starting automatically ... 73
7.3 Inspection and test ... 73
7.3.1 General ... 73
7.3.2 Constructional inspection and acceptance inspection and test ... 73
7.4 Accompanying documents (in particular, instruction handbook) ... 74
7.4.1 ... 74
7.4.2 Presentation of the instruction handbook ... 77
7.4.3 Advice for drafting and editing information for use ... 77
7.5 Marking ... 77

Annex A (normative) Building interfaces ... 78

A.1 General ... 78
A.2 Free space for users ... 78
A.3 Machinery spaces outside the truss ... 79
A.4 Measures to prevent access of shopping trolleys and baggage carts ... 80
A.4.1 General ... 80
A.4.2 Barriers ... 80
A.5 Fixed guiding barriers and traffic columns ... 81
A.6 Electric power supply ... 82

Annex B (normative) Electronic components - Failure exclusion ... 86

B.1 Scope ... 86
B.2 Failure exclusions - conditions ... 86

Annex C (normative) Drafting and assessing failsafe circuits ... 90

Annex D (normative) Testing of failsafe circuits containing electronic components and/or safety related electrical, electronic and programmable electronic devices (E/E/PE) 91

D.1 General 91
D.2 General provisions 91
D.2.1 Failsafe circuits containing electronic components 91
D.2.2 Safety related electrical, electronic and programmable electronic devices (E/E/PE) 91
D.3 Test samples 91
D.4 Mechanical tests 92
D.4.1 General 92
D.4.2 Vibrations 92
D.4.3 Bumping 92
D.5 Climatic stress testing 93
D.5.1 Temperature tests 93
D.5.2 Humidity tests 93
D.6 Functional and safety test of E/E/PE 93

Annex E (informative) Design guideline for safety circuits 94

Annex F (informative) Examples of possible dynamic torsional tests for steps and pallets 95

F.1 General 95
F.2 Torsional test 1 95
F.3 Torsional test 2 96

Annex G (normative) Safety signs for the user of escalators and moving walks 98

Annex H (informative) Guidelines for selection and planning of escalators and moving walks 100

H.1 Maximum capacity 100
H.2 Escalators or moving walks for public transport 100

Annex I (normative) Requirements on escalators and moving walks intended to transport shopping trolleys and baggage carts 101

I.1 Escalators 101
I.2 Moving walks 102

Annex J (informative) Determination of anti-slip properties of the tread surfaces of steps and pallets, of comb plates and floor plates 103

J.1 Introduction 103
J.2 Testing and assessing anti-slip properties 103

Annex K (informative) Determination of sliding properties of footwear on balustrade skirting 105

K.1 Introduction 105
K.2 Testing and assessing sliding properties 105

Annex L (informative) Major modification 106

Annex M (normative) Escalators and moving walks subject to seismic conditions 107

M.1 Introduction 107
M.2 Structural requirements 107
M.2.1 General 107
M.2.2 Supports 107
M.2.3 Arrangement 107
M.2.4 Mechanical safety devices for escalators and moving walks 107
M.3 Design requirements 107
M.3.1 General 107

M.3.2 Truss 107
M.3.3 Mass for the truss of escalators and moving walks 108
M.3.4 Condition of loading and deformation during a seismic event 108
M.3.5 Calculation procedure according to EN 1998-1:2004 108
M.4 Machinery 108
M.5 Electrical installation and other equipment 108

N.1 Format of an interpretation request 110
N.2 Format of an interpretation 111

Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC aimed to be covered 112

Bibliography 113