DIN EN 1991-1-2:2026-09 (E)

Eurocode 1 - Actions on structures - Part 1-2: Actions on structures exposed to fire

Contents

Page

European foreword 5

Introduction 6

1 Scope 10
1.2 Assumptions 10

2 Normative references 10

3 Terms, definitions and symbols 11
3.1 Terms and definitions 11
3.1.1 Common terms used in Eurocode Fire parts 11
3.1.2 Special terms relating to design in general 13
3.1.3 Terms relating to thermal actions 13
3.1.4 Terms relating to heat transfer analysis 15
3.2 Symbols and abbreviations 16
3.2.1 Latin upper case letters 16
3.2.2 Latin lower case letters 18
3.2.3 Greek upper case letters 19
3.2.4 Greek lower case letters 20

4 Structural fire design procedure 21
4.1 General 21
4.2 Design fire scenario 21
4.3 Design fire 21
4.4 Temperature analysis of members 21
4.5 Mechanical analysis of members 22

5 Thermal actions for temperature analysis 23
5.1 Heat flux 23
5.2 Nominal fire curves 24
5.2.1 Standard fire curve 24
5.2.2 External fire curve 24
5.2.3 Hydrocarbon fire curve 24
5.3 Physically based fire models 25
5.3.1 Simplified fire models 25
5.3.2 Advanced fire models 25

6 Mechanical actions for structural analysis 26
6.1 General 26
6.2 Simultaneity of actions 26
6.2.1 Actions from normal temperature design 26
6.2.2 Additional actions 27
6.3 Combination rules for actions 27
6.3.1 General rule 27
6.3.2 Simplified rules 27
6.3.3 Load level 29

Annex A (informative) Parametric fire curves 30

A.1 Use of this annex 30
A.2 Scope and field of application 30

A.3 Fire curves in the heating phase 30
A.4 Fire curves in the cooling phase 32

Annex B (informative) Thermal actions for external members -- Simplified calculation method 33

B.1 Use of this annex 33
B.2 Scope and field of application 33
B.3 Conditions of use 33
B.4 Effects of wind 34
B.4.1 Mode of ventilation 34
B.4.2 Flame deflection by wind 34
B.5 Characteristics of fire and flames 35
B.5.1 No forced draught 35
B.5.2 Forced draught 38
B.6 Overall configuration factors 41

Annex C (informative) Localized fires 42

C.1 Use of this annex 42
C.2 Scope and field of application 42
C.3 Virtual solid flame 42
C.3.1 Shape of the virtual solid flame 42
C.3.2 Temperature of the virtual solid flame 43
C.3.3 Virtual solid flame position and extension 44
C.3.4 Net heat flux 48

Annex D (informative) Advanced fire models 49

D.1 Use of this annex 49
D.2 Scope and field of application 49
D.3 One-zone models 49
D.4 Two-zone models 50
D.5 Computational fluid dynamics models 50

Annex E (informative) Fire load densities, fire growth rates and rate of heat releases 51

E.1 Use of this annex 51
E.2 Scope and field of application 51
E.3 Design value of fire load density 51
E.4 Determination of fire load densities 54
E.4.1 General 54
E.4.2 Definitions 54
E.4.3 Protected fire loads 55
E.4.4 Net calorific values 55
E.4.5 Fire load classification of occupancies 57
E.4.6 Individual assessment of fire load densities 58
E.5 Combustion behaviour 58
E.6 Rate of heat release Q 58

Annex F (informative) Equivalent time of fire exposure 61

F.1 Use of this annex 61
F.2 Scope and field of application 61
F.3 Equivalent time of standard fire exposure 61

Annex G (informative) Configuration factor 63

G.1 Use of this annex 63
G.2 Scope and field of application 63
G.3 General 63
G.4 Shadow effects 64
G.5 External members 64

G.6 Virtual solid flame 67

Annex H (informative) Thermal actions for structural fire loads of timber structures 71

H.1 Use of this annex 71
H.2 Scope and field of application 71
H.3 General 71
H.4 Structural fire load by the timber members 72

Bibliography 75