Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	Revised numbering – all clauses

Reason for change

Ease of use, clarity and consistency. Based on recommended structure from TC250 (ref.)

Original content

N/A

Change

N/A

Background information

Changes reflect an improved layout and are based on recommended structure provided by TC250.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	1.1 (1)

Reason for change

Ease of use, clarity and consistency.

Original content

The methods given in this Part 1-2 of EN 1991 are applicable to buildings, with a fire load related to the building and its occupancy.

Change

The methods given in this Part of EN 1991 are applicable to buildings and civil engineering works, with a fire load related to the building and its occupancy.

Background information

Removed reference to 1-2 as superfluous and to ensure consistency between the fire parts of the various material codes.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	1.1 (2)

Reason for change

Ease of use, clarity and consistency and update reference to harmonised standards.

Original content

This Part 1-2 of EN 1991 deals with thermal and mechanical actions on structures exposed to fire. It is intended to be used in conjunction with the fire design Parts of prEN 1992 to prEN 1996 and prEN 1999 which give rules for designing structures for fire resistance.

Change

This Part of EN 1991 deals with thermal and mechanical actions on structures exposed to fire. It is intended to be used in conjunction with the fire design parts of EN 1992 to EN 1996 and EN 1999 which give rules for designing structures for fire resistance.

Background information

Removed reference to 1-2 as superfluous and to ensure consistency between the fire parts of the various material codes. Updated reference to harmonised standards.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	1.1 (3)

Reason for change

Ease of use, clarity and consistency.

Original content

This Part 1-2 of EN 1991 contains thermal actions related to nominal and physically based thermal actions. More data and models for physically based thermal actions are given in annexes.

Change

This Part of EN 1991 contains thermal actions either nominal or physically based. More data and models for physically based thermal actions are given in annexes.

Background information

Revised text better English and easier to understand.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	1.1 (4)

Reason for change

Ease of use, clarity and consistency.

Original content

This Part 1-2 of EN 1991 gives general principles and application rules in connection to thermal and mechanical actions to be used in conjunction with EN 1990, EN 1991-1-1, EN 1991-1-3 and EN 1991-1-4.

Change

This Part of EN1991 gives general principles and application rules in connection to thermal and mechanical actions to be used in conjunction with EN 1990, EN 1991-1-1, EN 1991-1-3 and EN 1991-1-4.

Background information

Removed reference to 1-2 as superfluous and to ensure consistency between the fire parts of the various material codes.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	1.1 (5)

Reason for change

Ease of use, clarity and consistency.

Original content

The assessment of the damage of a structure after a fire, is not covered by the present document.

Change

The assessment of the damage to a structure after fire is not covered in this standard.

Background information

Revised text better English and easier to understand.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	1.5 (1)

Reason for change

Ease of use, clarity and consistency.

Original content

For the purposes of this European Standard, the terms and definitions given in EN 1990:2002, 1.5 and the following apply.

Change

For the purposes of this Part of EN1991, the definitions of EN1990 apply with the following additional definitions:

Background information

Text changed to ensure consistency between the fire parts of the various material codes and removed reference to dated standard and clause reference.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	1.5 (all clauses)

Reason for change

Ease of use, clarity and consistency.

Original content

Definitions split by topic.

Change

Remove distinction by topic. Revised numbering system to improve clarity and ease of use.

Background information

New structure and numbering system improves clarity and ease of use.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	1.6 (1)

Reason for change

Ease of use, clarity and consistency.

Original content

For the purpose of this Part 1-2, the following symbols apply.

Change

For the purposes of this Part of EN1991, the following symbols apply:

Background information

Removed reference to 1-2 as superfluous and to ensure consistency between the fire parts of the various material codes.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	2.1 (1) Note

Reason for change

Ease of use, clarity and consistency.

Original content

Mechanical behaviour of a structure is depending on thermal actions and their thermal effect on material properties and indirect mechanical actions, as well as on the direct effect of mechanical actions.

Change

Mechanical behaviour of a structure is dependent on thermal actions and their thermal effect on material properties and indirect mechanical actions, as well as on the direct effect of mechanical actions.

Background information

Improved English.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	2.2 (3)

Reason for change

Ease of use, clarity and consistency.

Original content

Time- and load-dependent structural behaviour prior to the accidental situation needs not be considered, unless (2) applies.

Change

Time and load dependent structural behaviour prior to the accidental situation need not be considered unless (2) applies.

Background information

Improved English.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	2.3 (1)

Reason for change

Ease of use, clarity and consistency.

Original content

For each design fire scenario, a design fire, in a fire compartment, should be estimated according to section 3 of this Part.

Change

For each design fire scenario, a design fire, in a fire compartment, should be determined according to section 5 of this Part of EN1991.

Background information

Change for consistency between the fire parts of the Eurocodes and reflect change in structure of the document.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	2.4 (4) Note 1

Reason for change

Ease of use, clarity and consistency.

Original content

NOTE 1 The specified period of time may be given in the national regulations or obtained from annex F following the specifications of the national annex.

Change

NOTE 1: The specified period of time may be given in the national regulations. If allowed by the national regulations, the specified period of time can be obtained from annex F of this Part of EN1991 following the specifications of the national annex.

Background information

For further information see Background Document for Task 1 Reduction of NDPs.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	2.4 (4) Note 2

Reason for change

Ease of use, clarity and consistency.

Original content

NOTE 2 Limited periods of fire resistance may be set in the national annex.

Change

NOTE 2: The national annex may refer to national regulations in which limited periods of fire resistance are specified.

Background information

For further information see Background Document for Task 1 Reduction of NDPs.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	3.1 (7)

Reason for change

Ease of use, clarity and consistency.

Original content

Where this Part or the fire design Parts of prEN 1992 to prEN 1996 and prEN 1999 give no specific data, the configuration factor should be taken as Φ = 1,0. A lower value may be chosen to take account of so called position and shadow effects.

Change

Where this Part or the fire design parts of EN1992 to EN1996 and EN1999 give no specific data, the configuration factor should be taken as Φ = 1.0. A lower value may be chosen to take account of so called position and shadow effects.

Background information

Update reference to harmonised standards.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	3.1 (9)

Reason for change

Ease of use, clarity and consistency.

Original content

The surface temperature Θ_m results from the temperature analysis of the member according to the fire design Parts 1-2 of prEN 1992 to prEN 1996 and prEN 1999, as relevant.

Change

The surface temperature Θ_m is obtained from the temperature analysis of the member according to the fire design Parts of EN1992 to EN1996 and EN1999, as relevant.

Background information

Improved clarity and updated reference to harmonised standards.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	3.1 (10)

Reason for change

Ease of use, clarity and consistency.

Original content

Gas temperatures Θ_g may be adopted as nominal temperature-time curves according to 3.2, or adopted according to the fire models given in 3.3.

Change

Gas temperatures Θ_g may be taken from nominal fire curves according to 5.2, or calculated according to the fire models given in 5.3.

Background information

Improved English.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	3.2

Reason for change

Ease of use, clarity and consistency.

Original content

Nominal temperature-time curves

Change

Nominal fire curves

Background information

Improved terminology.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	3.2.1

Reason for change

Ease of use, clarity and consistency.

Original content

Standard temperature-time curve

Change

Standard fire curve

Background information

Improved terminology.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	3.2.3

Reason for change

Ease of use, clarity and consistency.

Original content

Hydrocarbon curve

Change

Hydrocarbon fire curve

Background information

Improved terminology.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	3.3

Reason for change

Ease of use, clarity and consistency.

Original content

Natural fire models

Change

Physically based fire models

Background information

Improved terminology.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	3.3.1.1 (1)

Reason for change

Ease of use, clarity and consistency.

Original content

Simple fire models are based on specific physical parameters with a limited field of application.

Change

Simplified fire models are based on specific parameters with a limited field of application.

Background information

Improved terminology.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	3.3.1.2 (1) Note 2

Reason for change

Ease of use, clarity and consistency.

Original content

For internal members of fire compartments, a method for the calculation of the gas temperature in the compartment is given in annex A.

Change

For internal members of fire compartments, a method for the calculation of the gas temperature in the compartment is given in annex A of this Part of EN1991.

Background information

Consistency with other fire parts.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	3.3.1.2 (2) Note

Reason for change

Ease of use, clarity and consistency.

Original content

For external members exposed to fire through openings in the facade, a method for the calculation of the heating conditions is given in annex B.

Change

For external members exposed to fire through openings in a façade, a method for the calculation of the heating conditions is given in annex B of this Part of EN1991.

Background information

Consistency with other fire parts.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	3.3.1.3 (1)

Reason for change

Ease of use, clarity and consistency.

Original content

Where flash-over is unlikely to occur, thermal actions of a localised fire should be taken into account.

Change

Where flashover is unlikely to occur, thermal actions of a localised fire should be taken into account.

Background information

No hyphen required.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	4.1 (3)

Reason for change

Ease of use, clarity and consistency.

Original content

Design values of indirect actions due to fire $A_{ind,d}$ should be determined on the basis of the design values of the thermal and mechanical material properties given in the fire design Parts of prEN 1992 to prEN 1996 and prEN 1999 and the relevant fire exposure.

Change

Design values of indirect actions due to fire $A_{ind,d}$ should be determined on the basis of the design values of the thermal and mechanical material properties given in the fire design Parts of EN 1992 to EN 1996 and EN 1999 and the relevant fire exposure.

Background information

Updated reference to harmonised standards.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	4.3.2 (1) Note

Reason for change

Ease of use, clarity and consistency.

Original content

This clause applies, for example, to effects of actions at boundaries and supports, where an analysis of parts of the structure is performed in accordance with the fire design Parts of prEN 1992 to prEN 1996 and prEN 1999.

Change

This clause applies, for example, to effects of actions at boundaries and supports, where an analysis of parts of the structure is performed in accordance with the fire design parts of EN 1992 to EN 1996 and EN 1999.

Background information

Updated reference to harmonised standards.

Subject	EN 1991-1-2
Clause N°/ Subclause N° / Annex	4.3.2 information from material codes

Reason for change

Ease of use, clarity and consistency.

Original content

N/A

Change

(3) For load combination (6.10) in EN 1990, the reduction factor η_{fi} should be taken as:

$$\eta_{fi} = \frac{G_k + \psi_{fi}\, Q_{k,1}}{\gamma_G\, G_k + \gamma_{Q,1}\, Q_{k,1}} \qquad (6.2)$$

or, for load combinations (6.10a) and (6.10b) in EN 1990, as the smallest value given by the following two expressions:

$$\eta_{fi} = \frac{G_k + \psi_{fi}\, Q_{k,1}}{\gamma_G\, G_k + \gamma_{Q,1}\, Q_{k,1}} \qquad (6.3)$$

$$\eta_{fi} = \frac{G_k + \psi_{fi}\, Q_{k,1}}{\xi\, \gamma_G\, G_k + \gamma_{Q,1}\, Q_{k,1}} \qquad (6.4)$$

where:

$Q_{k,1}$ is the characteristic value of the leading variable action 1;

G_k is the characteristic value of the permanent action;

γ_G is the partial factor for the permanent action;

$\gamma_{Q,1}$ is the partial factor for the leading variable action 1;

ψ_{fi} is the combination factor for variable actions in the fire situation, given either by $\psi_{1,1}$ or $\psi_{2,1}$, see EN 1991-1-2;

ξ is a reduction factor for the unfavourable permanent action G_k.

NOTE 1: The choice of load combinations between expression (6.2) and expressions (6.3) and (6.4) may be found in the national annex of EN1990.

NOTE 2: An example of the variation of the reduction factor η_{fi} versus the load ratio $Q_{k,1}/G_k$ for different values of the combination factor ψ_{fi} according to expression (2.6) is shown in figure 6.1 with the following assumptions: γ_G = 1,35 and $\gamma_{Q,1}$ = 1,5. Partial factors are specified in the relevant national annexes of EN 1990. Expressions (6.3) and (6.4) give slightly higher values.

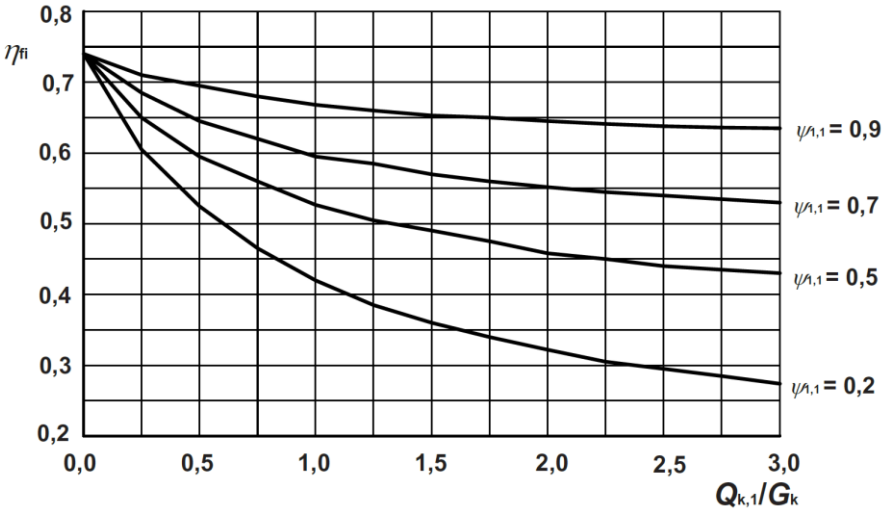

Figure 6.1 – Examples of reduction factor η_{fi} versus load ratio $Q_{k,1}/G_k$ according to expression (6.2)

(4) As a simplification, recommended values of η_{fi} may be used as defined in the relevant material Eurocode. The choice of recommended values for the reduction factor η_{fi} may be found in the national annex.

Background information

This information is common to all material parts and for reasons of brevity and ease of use it is better off in the actions part rather than the material parts.