



SR EN 1991-1-2/NA

October 2006

ROMANIAN STANDARD

Eurocode 1: Actions on structures- Part 1-2: General actions-Actions on structures exposed to fire. National Annex

Eurocod 1: Acțiuni asupra structurilor. Partea 1-2: Acțiuni generale - Acțiuni asupra structurilor expuse la foc. Anexă națională

Eurocode 1: Actions sur les structures -- Partie 1-2: Actions générales-Actions sur les structures exposées. Annexe Nationale

APPROVAL

| Approved by the Director General of ASRO on 12 October 2006

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Foreword

SR EN 1991-1-2:2004/NA:2006 is the National Annex NA which defines the conditions of application for SR EN 1991-1-2:2004 in Romania.

This National Annex has been prepared by the Technical Committee CT 343 "Basis of Design and Structural Eurocodes" of ASRO, the Secretariat of which is held by INCERC (National Institute for Building Research), under the authority of the Ministry of Transports, Constructions and Tourism.

This National Annex:

- provides Nationally Determined Parameters (NDP) for the following clauses of the European Standard EN 1991-1-2:2002, which allows the national choice for:

- 2.4(4)
- 3.1(10)
- 3.3.1.2 (1)
- 3.3.1.3.(1)
- 3.3.2 (2)
- 4.2.2 (2)
- 4.3.1(2)

- defines conditions of application for the SR EN 1991-1-2:2004 informative Annexes, A, B, C, D, E, F and G.

This National Annex plays a double role:

- on European level, based on CEN regulations, as an informative annex of EN 1991-1-2:2002, published by ASRO as the Romanian Standard SR EN 1991-1-2:2004 and

- on national level, as a distinct standard SR EN 1991-1-2:2004/NA:2006, which contains information on Nationally Determined Parameters to be used for assessment safety on structures exposed to fire accordance with the Romanian Standard SR EN 1991-1-2 :2004.

The Romanian Standards SR EN 1991-1-2:2004/NA:2006, SR EN 1991-1-2:2004 and SR EN 1990:2004 with its National Annex and the Eurocodes EN 1991 to EN 1999 with their National Annexes should be used, the last after their national endorsement and implementation, to determine actions on structures exposed to fire and assessment of buildings and civil engineering works.

For the purpose of this national standard, the clause numbers had given in SR EN 1991-1-2:2004 apply.

I. Terms and definitions

For the purposes of this Standard, the terms and definitions given in SR EN 1991-1-2:2004, 1.5 and the following apply:

I.1 fire resistance grade

Global ability of a construction or fire compartment its required of the actions standard fire (nominal curve fire), defined by minimal performances a principal member or part of the structure:

- columns, diaphragms, load bearing walls;
- beams, floors, terrace roofs;
- load bearing or non-load bearing walls;
- braces, roofs structure without attic;
- self supporting roofs (curved) without attic;
- roofing and roofing support combustible (except simply steel sheet).

Classification of construction members comprises five grade of fire resistance.

I.2 fire resistance grade for first transition period

Fire resistance grade available for first transition period, i.e., to normative documents revision for fire safety. Roman numbers notes grad (for example II grad).

I.3 fire resistance grade for second transition period

Fire resistance grade available for second transition period, i.e., to normative documents revision for fire safety. Arabic numbers notes grad (for example 2 grad).

II. Nationally Determined Parameters for SR EN 1991-1-2:2004

Section 2 Structural Fire design procedure

2.4 Temperature Analysis

(4) 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.

In order to determine fire resistance technical data specified in the N.2.4.1.1 and NA.2.4.1.2 table is used.

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

When structural members analysis is based on data presented in tables NA.2.4.1.1 and NA 2.4.1.2 or other simplified rules, referring to the nominal temperature-time curve, the temperature analysis is made only for the heating phase (without any cooling phase);

Table NA.2.4.1.1 - Limited periods of fire resistance (for the first transition period)

N°	Type of structural elements	Fire resistance degree				
		I	II	III	IV	V
1	Columns	R 150	R 120	R 60	R 30	–
2	Load bearing walls, diaphragms	REI 150	REI 120	REI 60	REI 30	–
3	Interior non -load bearing walls	EI 30	EI 30	EI 15	–	–
4	Exterior non- load bearing walls	EI 15	EI 15	EI 15	EI 15	–
5	Beams, frames, panes	R 60	R 45 (R 30)	R 45 (R 30)	R 15	–
6	Floors, terrace roofs	REI 60	REI 45 (REI 30)	REI 45 (REI 30)	REI 15	–
7	Braces Roofs structure without attic	R 45 (R 30)	R 30 (R 15)	R 15	–	–
8	Self supporting roofs (double curved) without attic	REI 45 (REI 30)	REI 30 (REI 15)	REI 15	–	–
9	Roof covering panels and the continuous support of the combustible covering (except simply steel sheet)	REI 15	–	–	–	–

NOTE 1: For symbols R, EI, REI, see SR EN 13501:2004.

REI – all the criteria are satisfied (load bearing capacity, fire integrity, thermal insulation)

R – only load bearing capacity criteria is satisfied

EI – only fire integrity and thermal insulation criteria are satisfied.

NOTE 2 : Bracelet numbers corresponding to buildings and fire compartments with the fire load density not exceeding 840Mj/m², except tall building, buildings including agglomerated rooms (as defined in Romanian fire code), buildings with occupants not able to evacuate themselves and buildings sheltering very important equipment.

Table NA.2.4.1.1 - Limited periods of fire resistance (for the second transition period)

N°	Type of structural elements	Fire resistance degree				
		1	2	3	4	5
1	Columns	R 150	R 120	R 60	R 30	R 15
2	Load bearing walls, diaphragms	REI 150	REI 120	REI 60	REI 30	REI 15
3	Interior non- load bearing walls	EI 45	EI 30	EI 15	–	–
4	Exterior non -load bearing walls	EI 30	EI 15	EI 15	EI 15	–
5	Beams, frames, panes	R 60	R 45	R 30	R 15	–
6	Floors, terrace roofs	REI 60	REI 45	REI 30	REI 15	–
7	Braces, roofs structure without attic	R 45	R 30	R 15	–	–
8	Self supporting roofs (curved) without attic	REI 45	REI 30	REI 15	–	–
9	Roof covering panels and the continuous support of the combustible covering (except simply steel sheet)	REI 15	REI 15	–	–	–

NOTE: For symbols R, EI, REI, see SR EN 13501:2004.

REI – all the criteria are satisfied (load bearing capacity, fire integrity, thermal insulation)

R – only load bearing capacity criteria is satisfied

EI – only fire integrity and thermal insulation criteria are satisfied.

NOTE 2: Bracelet numbers correspond to buildings and fire compartments with the fire load density not exceeding 840MJ/m^2 , except tall building, buildings including agglomerated rooms (as defined in Romanian fire code), buildings with occupants not able to evacuate themselves and buildings sheltering very important equipment.

Section 3 Thermal actions for temperature analysis

3.1 General rules

(10) NOTE The use of the nominal temperature-time curves according to 3.2 or, as an alternative, the use of the natural fire models according to 3.3 may be specified in the national annex.

The nominal temperature-time curves according to 3.2 or, as an alternative, the use of the natural fire models according to 3.3 are used on the national territory.

3.3 Natural fire models

3.3.1 Simplified fire models

3.3.1.2 Compartment fires

(1) NOTE 1 The national annex may specify the procedure for calculating the heating conditions.

For fire compartments (meaning room) may be used one-zone model.

3.3.1.3 Localised fires

(1) **NOTE** The national annex may specify the procedure for calculating the heating conditions. A method for the calculation of thermal actions from localised fires is given in annex C.

For localized fires (space limited) the method given in annex C to SR EN 1991-1-2 can be used.

3.3.2 Advanced fire models

(2) **NOTE** The national annex may specify the procedure for calculating the heating conditions. A method for the calculation of thermal actions in case of one-zone, two-zone or computational fluid dynamic models is given in annex D.

One of the following models are used when calculating:

- one-zone models assuming a uniform, time dependent temperature distribution in the compartment;
- two-zone models assuming an upper hot layer with time dependent thickness and with time dependent uniform temperature,
- Computational Fluid Dynamic models giving the temperature evolution in the compartment (the respective room) in a completely time and space dependent manner.

In figure NA.1 the basis concept of two-zone model is presented.

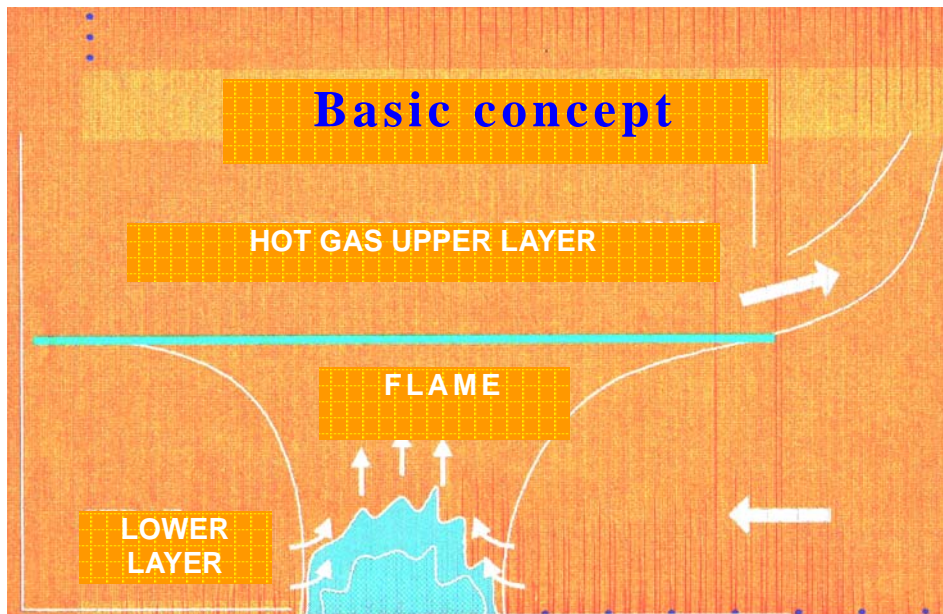


Figure NA 1: The basis concept of two-zone model

Section 4 Mechanical actions for structural analysis

4.2 Simultaneity of actions

4.2.2 Additional actions

a. It is not required for fire walls to resist a horizontal impact load according to EN 1363-2:2001.

b. The decrease of imposed loads due to melting of snow in case of fire should not be taken into account (based on statistic analysis of low temperatures on national level, so as the experience of actual fires).

(2) NOTE The choice of additional actions may be specified in the national annex.

The following additional actions may be taken into account on a case by case basis:

- snow action;
- wind action;
- actions due to explosions;
- impact actions heavy machinery.
- collapse of structural members of the building;
- actions due to breakdown of machineries
- actions due to sudden alteration of the technological process or in time of revisions
- additional loadings or pressure of medium duration;
- chain cumulating effect of longitudinal dilatation of fire unexposed structures adjacent to the exposed zone

The following shall not be taken into account:

- seismic actions;
- floods (except for production and/or store spaces with substances self igniting in contact with water, e.g. carbide);
- structural support displacements;
- earth slides;
- actions due to periodical climatic and technologic changes of temperature;
- dust climatic or technologic deposits;
- hailstone effect.

4.3 Combination rules for actions

4.3.1 General rule

(2) NOTE The use of the quasi-permanent value $\psi_{2,1} Q_1$ or the frequent value $\psi_{1,1} Q_1$ may be specified in the national annex. The use of $\psi_{2,1} Q_1$ is recommended.

For the representative variable action Q_1 shall be used the quasi-permanent value $\psi_{2,1} Q_1$.

III. Conditions of use of the annex of standard SR EN 1991-1-2:2004

Annex A (informative) – Parametric temperature-time curves

Annex A keeps the informative character referring the use of standard SR EN 1991-1-2:2004 and the national annex. Parametric temperature-time curves may be used based on a validated computer model. The choice of the parametric temperature-time curves to be used, must be based on a competent fire expert analysis. The results will be compared with the results of the simplified calculation method using nominal fire curve; the most unfavorable result will be used

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

Annex B keeps the informative character referring the use of standard SR EN 1991-1-2:2004 and the national annex.

Annex C (informative) – Localised fires

Annex C keeps the informative character referring the use of standard SR EN 1991-1-2:2004 and the national annex

Annex D (informative) – Advanced fire models

Annex D keeps the informative character referring the use of standard SR EN 1991-1-2:2004 and the national annex

Annex E (informative) – Fire load densities

Annex E has normative character in calculation of fire load densities referring the use of standard SR EN 1991-1-2:2004 and the national annex

Annex F (informative) – Equivalent time of fire exposure

Annex F keeps the informative character referring the use of standard SR EN 1991-1-2:2004 and the national annex

Annex G (informative) – Configuration factor

Annex G keeps the informative character referring the use of standard SR EN 1991-1-2:2004 and the national annex

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A Romanian standard does not necessarily include the totality of necessary provisions for contracting. Standard users are responsible for its enforcement.

It is important that users of Romanian standards ensure they have the latest edition and all changes.

Information on Romanian standards (enforcement date, changes etc.) are published in the *Romanian Standards Catalogue* and in the *Standards Bulletin*.