

SNIP Fire Code Chapter 1

02-85 FIRE PREVENTION CODE

Building Codes OF Russia

Chapter 1. FIRE RESISTANCE OF BUILDINGS, STRUCTURES, AND FIRE COMPARTMENTS

Section 1.1. General: Buildings, structures, and parts thereof (hereinafter referred to as “buildings”) separated by fire walls of Type 1 (fire compartments) shall be classified by degree of *fireresistance*. The degree of *fireresistance* of buildings shall be determined by minimum fireresistance ratings of building components (specified in Table 1) and maximum *flame spread* ratings of components thereof.

Fire rating of selfbearing walls affecting rigidity and stability of buildings shall be assumed according to Table 1.

Where the minimum fireresistance rating of structural members does not exceed 0.25 *hr*, it is allowed to use unprotected steel components. Aluminum sheets may also be used as exterior enclosures irrespective of the actual fireresistance rating thereof.

Columns with 0.75 *hr fireresistance* may be used in production and storage buildings of Degree II of *fireresistance*.

Gypsum board sheets may be used in buildings of all degree of *firesistance* to enclose metal structures to increase firesistance rating thereof according to GOST 6266-89.

Partitions (glazed or with open mesh infill and solid portion not exceeding 1.2 m in height; movable and sliding partitions) with unspecified fireresistance rating and flame spread rating may be used in buildings of all degrees of *firesistance* for separation of working places within the space.

Section 1.2. Degrees of *fireresistance* of buildings shall be assumed according to purpose, category of explosion-and-fire hazards, number of stories, and floor area within a fire compartment, with the exception of cases specified in regulatory documents.

Basic structural characteristics of buildings with respect to their degree of *firesistance* are specified in Appendix 2.

Section 1.3. Fire ratings of building components shall be determined by ST SEV 1000-78.

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Flame spread ratings of building components shall be determined according to provisions of Appendix 1.

Section 1.4. Building materials classification: *Buildings materials shall be classified by their combustibility, flammability, smoke-producing capacity, and toxic content in accordance with provisions of SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch. 5, Sec. 5.3 through 5.8, - Editor.*

Table 1

Degree of fire resistance	Minimum fire resistance rating of building components, in hours (shown in the first line) Maximum flame spread rating, in cm (shown in the second line)								
	walls				Other elements			Roof elements	
	Bearing walls and staircase enclosures	selfbearing	Exterior non-bearing And curtain walls	Internal partitions	columns	Landings, strings, steps, beams and flights	Slabs, decks (including insulated), and other bearing floor elements	Slabs, decks (including insulated) and girders	Beams, trusses, arches, and frames
I	2.5	1.25	0.5	0.5	2.5	1	1	0.5	0.5
	0	0	0	0	0	0	0	0	0
II	2	1	0.25	0.25	2	1	0.75	0.25	0.25
	0	0	0	0	0	0	0	0	0
III	2	1	0.25; 0.5	0.25	2	1	0.75	N/R	N/R
	0	0	0; 40	40	0	0	25	N/R	N/R
IIIA	1	0.5	0.25	0.25	0.25	1	0.25	0.25	0.25
	0	0	40	40	0	0	0	25	0
IIIB	1	0.5	0.25 0.5	0.25	1	0.75	0.75	0.25 0.5	0.75
	40	40	0; 40	40	40	0	25	N/R	N/R
IV	0.5	0.25	0.25	0.25	0.5	0.25	0.25	N/R	N/R
	40	40	40	40	40	25	25	N/R	N/R
IVA	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
	40	40	N/R	40	0	0	0	N/R	0
V	Not regulated								

Notes: Flame spread ratings for vertical and sloped part are shown in brackets.

N/R – not specified

Refer to SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch. 5, Sec. 5.18, Table 4 for current fire resistance classification. – Editor

Section 1.5. Framework of suspended ceilings: *refer to SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch. 6, Sec. 6.25. – Editor*

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Suspended ceilings may be made of combustible materials with the exception of suspended ceilings in public corridors, staircases, stairways, vestibules, lobbies, and foyers of buildings of fire resistance Degree I through IVa.

The placement of ducts and pipelines in the space above the suspended ceilings: refer to SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch. 7, Sec. 7.14. – Editor

Suspended ceilings used for increasing fire resistance limits of roofs and inter-storey slabs: refer to SNIP 21-01-97, Fire Safety of buildings and Structures, Ch. 7, Sec. 7.14. – Editor

Section 1.6. Partitions in buildings of fire resistance Degrees I and II constructed of gypsum board sheets shall have a fire resistance rating of not less than 1 hr for boards and 0.5 hr for noncombustible studs according to GOST 6266-89. Noncombustible paints shall be used for gypsum board sheets in public corridors, staircases, vestibules, lobbies, and foyers.

Section 1.7. Structures supporting inclined floors in auditoriums shall comply with requirements established in Table 1 for slabs, decks, and other bearing components of floors.

Structures supporting inclined floors: refer to SNIP 21-01-97, Fire Safety of Buildings and structures, Ch. 7, Sec. 7.10. – Editor

Section 1.8. Use of materials: Combustible materials shall be used in buildings of all degrees of fire resistance for roof coverings, rafters, and sheathing of attic roofs, for floors, doors, gates, window and skylight sashes as well as for finishes of walls and ceilings irrespective of specified flame spread rating thereof. Rafters and sheathing of attic roofs, with the exception of buildings of fire resistance Degree V, shall be impregnated with fire-retardant. The quality of fireproofing shall ensure not more than 25% weight loss of fire protected wood during the fire test according to ST SEV 4686-84.

Where rafters and sheathing made of combustible materials are used in buildings with attics, with the exception of buildings of fire resistance Degree V, the roof covering shall be made of noncombustible materials.

Where combustible liquids are produced, used, or stored, the floors shall be made of noncombustible materials.

In buildings of all degrees of fire resistance, with the exception if fire resistance Degree V, it is not allowed to use combustible wall paper and other materials as wall and ceiling finishes in public corridors, staircases, vestibules, lobbies, and foyers. Floors in lobbies, staircases, and elevator lobbies shall be made of noncombustible materials.

Exterior wall cladding shall be made of combustible and slightly combustible materials in buildings of fire resistance Degree I, II and III.

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Doors of built-in fire hose cabinets may be made of combustible materials.

Section 1.9. Cavities: No cavities enclosed by combustible materials shall be allowed in walls, partitions, floors, and roofs of buildings, with the exception of the cavities

- In wood structures of slabs and roofs divided by solid diaphragms into compartments with the area of not more than 54 m² as well as along the perimeter of interior walls
- Between steel (or aluminum) shaped sheets and a vapor barrier provided that insulation is made of noncombustible or slightly combustible material. Where
- combustible insulation is used (with or without a vapor barrier), these cavities shall be filled with noncombustible or slightly combustible materials for the length of not less than 25 cm from the panels' edges
- Between nonpropagating building structures and their combustible finishes from the side of the rooms, provided that these cavities shall be divided by solid diaphragms into compartments of not more than 3 m² in area
- Between combustible finishes and external wall surfaces of one-story buildings having 6 m in height measured from grade to the cornice and having up to 300 m² of gross construction area, provided that these cavities shall be divided by solid diaphragms into compartments with an area of not more than 7.2 m²

Solid diaphragms may be made of combustible materials.

Chapter 2. SPACE-PLANING AND STRUCTURAL CONCEPTS OF BUILDINGS

Section 2.1. Location restrictions: No spaces where combustible gases and liquids are used or stored as well as spaces with processes resulting in formation of combustible dusts, shall be located directly under spaces intended for simultaneous occupancy by more than 50 persons.

Notes: Degrees of fire-and-explosion hazard for substance shall be determined by GOST 12.1.044-89.

For current requirements, refer to SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch. 7, Sec. 7.7. – Editor

Section 2.2. Basements of buildings shall have one-story, unless specified otherwise in appropriate SNIP codes. No rooms where combustible gases, liquids, and easily flammable materials are used or stored shall be placed in basement and semi-basement stories.

Section 2.3. Windows in basements: Not less than two 0.75x1.2 m windows with pits shall be provided in each compartment of the basement floor, or corridor separated by fire walls or partitions, having spaces for the use or storage of combustible substances and materials. A free area of these windows shall not be less than 0.2% of the floor area served.

Section 2.4. Service spaces in basements: Spaces located as basement floors and used for mechanical equipment and utility lines shall be separated from other spaces by fire rated partitions.

Section 2.5. Service cellars used for utility networks shall have separate exits to the outside through the doors not less than 0.75x1.5 m in size or hatches not less than 0.6x0.8 m in size equipped with vertical stairs.

Only one door or hatch shall also be provided for each additional 2,000 m² of floor area.

Section 2.6. The minimum ceiling height of the passageways within service stories (including service cellars) shall not be less than 1.8 m.

The passageway with the minimum ceiling height of not less than 1.6 m shall be provided in the attic story.

Section 2.7. Hatches in the enclosing structure of an attic's pocket recesses shall be designed in mansard buildings.

Section 2.8. Roof guardrails shall be provided in accordance with GOST 25772-83, *Steel Guardrails of Stairways, Balconies, and Roofs. General Specifications* for buildings:

- With the roof slope up to 12 percent inclusively and the height over 10 m measured to the roof cornice or the top of exterior wall (parapet).
- With the roof slope exceeding 12 percent and the height over 7 m measured to the roof cornice.

Guardrails complying with requirements of that GOST shall be installed, irrespective of a building height, on habitable roofs, balconies, loggias, exterior galleries, open exterior stairways, stairway flights, and landings.

Section 2.9. Exits to roofs from staircases directly or through attics (with the exception of heated ones) and exterior fire escape ladders shall be provided for buildings over 10 m in height measured to the cornice of the roof, or to the top of exterior wall (parapet).

The number of exits to a roof shall not be less than one exit for each complete or incomplete

- 100 m of length of residential, public, and service units attic roof.
- 1,000 m² of roof area of residential, public, and service units without attics.

Fire escape ladders placed every 200 m along the perimeter of a building shall be provided for industrial and storage units.

It is allowed not to provide fire escape ladders on the main façade of a building up to 150 m long if a fire fighting water standpipe is available on the side of the building opposite to the main façade.

Other exterior stairs having exits to the roof (according to requirements of Section 2.12 or 4.20) may be used in calculation of the required number of exits to the roof.

Exits to roofs equipped with stationary ladders through doors, hatches, or windows with sizes of not less than 0.6x0.8 m, shall be arranged in attics of buildings.

No exit to the roof of a one-story building is required in the roof area does not exceed 100 m².

Section 2.10. Exits to roofs: Exits from staircases to roofs or attics shall be provided through stairway flights with landings in front of exits and fire resistant doors of Type 2.

Exits from staircases to roofs or attics through fire hatches of Type 2 (with sizes of 0.6x0.8 m using permanent steel step ladders) may be arranged in residential, public, and service units having not more than 5 stories (*or 15 m in height according to SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch. 8, Sec. 8.4.-Editor*).

Section 2.11. Fire escape ladders shall be provided in places of roof elevation changes of over 1 m (including cases where such changes are provided for lifting/aeration skylights to the roof).

Section 2.12. Fire escapes are classified as follows:

Type I Vertical steel fire escapes, 0.7 m in width, starting at a level of 2.5 m above grade, with landings at the exit to the roof. Guarding arcs shall be installed every 0.7 m starting from

10 m point above grade with 0.35 m curvature radius and the center offset by 0.45 m from the plane of the escape. A 0.6 m high guardrail shall be provided for the landing at the roof exit

Type 2 Steel flight fire escape stairways with grade of not more than 6:1, 0.7 m in width, starting at a level of 2.5 m above grade, with landings provided for every 8 m of eight thereof equipped with handrails.

SNIP 21-01-97, Fire Safety of Building and Structures, Ch.8, Sec.8.8 refers to the types of fire escapes as P1 and P2. – Editor

Section 2.13. Fire escape ladders: The following types of fire escape ladders shall be used:

- **Type 1** for climbing to a 10 to 20 m height, and in places of roof elevation changes of 1 to 20 m.
- **Type 2** for climbing to over 20 m height, and in places of roof elevation changes of over 20 m.

Section 2.14. Penetrations: All penetrations caused by cables and pipelines going through fire rated barriers shall be sealed entirely with building mortar.

Combustible penetrations: refer to SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch. 7, Sec. 7.11. - Editor

Chapter 3. FIRE PROTECTION BARRIERS

Section 3.1. General: The following elements can be considered as fire barriers:

- Fire rated walls and partitions.
- Fire rated slabs.
- Fire compartments.
- Smokeproof vestibules.
- Opening protectives(i.e doors, windows, hatches, and dampers).

Fire protection barriers shall be used as specified in Sections 1.1, 2.4, 3.4, 3.11, 3.13, 3.15, 3.17, 3.21, and appropriate SNIP codes.

Section 3.2. Classification: By the fireresistance of enclosing parts, fire protection barriers shall be classified by the types given in Table2.

For current classification, refer to SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch. 5, Sec. 5.12 through 5.14, - Editor

Fire rated walls, partitions, slabs, components of fire compartments, vestibules, and opening protectives within fire protection barriers shall be made of noncombustible materials.

Wood protected on all sides by at least 4 mm thick layer of noncombustible material, or deeply impregnated with fire-retardant in compliance with the requirements for slightly combustible materials, may be used in opening protectives of doors and hatches of Types 1 and 2.

Partitions may be constructed of noncombustible frames and gypsum board sheets (according to GOST 6266-89) having a fireresistance rating of not less than 1.25 hr for partitions of Type 1 and 0.75 hr for partitions of Type 2. intersection of these partitions with other building components shall have a fireresistance rating of not less than 1.25 hr for partitions of Type 1 and 0.75 hr for partitions of Type 2.

Table 2

Fire protection barriers	Type of fire barriers and elements thereof	Minimum Fireresistance Rating, in hours
Fire rated walls	1	2.5
	2	0.75
Fire rated partitions	1	0.75
	2	0.25
Fire rated slabs	1	2.5
	2	1
	3	0.75
Fire rated doors and windows	1	1.2
	2	0.6
	3	0.25

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Fire rated gates, hatches, dampers	2	0.6
Smoke-proof vestibule elements:		
Fire rated partitions	1	0.75
Fire rated slabs	3	0.75
Fire rated doors	2	0.6
Fire protection compartment (refer to Section 3.13 for definition)elements:	1	-
Enclosing fire rated walls	2	0.75
Fire rated partitions within a fire compartment	2	0.25
columns	-	2.5
Fire rated slabs	3	0.75
Roof coverings	-	0.75
Exterior walls	-	0.75

Section 3.3. Opening protectives: A fireresistance rating of fire doors and gates shall be specified by St SEV 3974-85. A fireresistance rating of windows, hatches, and dampers shall be specified by ST SEV 1000-78. The limit of fireresistance for windows shall be determined by failure and loss of density. The limit of fireresistance for doors of elevator shafts shall be determined by thermal capacity reduction and loss of density of the door.

Section 3.4. Opening protectives: Fire rated doors, gates, windows, and dampers of Type 1 and 2 shall be provided in fire walls of Type 1 and 2, respectively.

Fire doors, gates, windows, and dampers of Type 2 shall be provided in fire rated partitions of Type 1. Fire rated doors and windows of Type 3 shall be provided in fire rated partitions of Type 2.

Fire rated hatches and dampers of Type 1 shall be provided in fire rated slabs of Type1. Fire hatches and dampers of Type 2 shall be provided in fire rated slabs of Type 2 and 3.

Refer to SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch.5, Sec.5.14 for current requirements for opening protectives. - Editor

Section 3.5. Continuity of fire walls: Fire walls shall have their own foundations and be continuous throughout the entire building height.

Fire walls may be installed directly on noncombustible structural frames of a building or structure. The fireresistance rating of the structural framing, fillings, and joints thereof shall not be less than the required fireresistance rating of the fire wall.

Section 3.6. Fire walls and roofs: Where at least one of the roof-supporting structures of the building with or without the attic, with the exception of a roof covering, is made of combustible materials, the topmost point of a fire wall shall not be less than 60 cm above the roof level, and not less than 30 cm , where elements of the roof with or without the attic (with the exception of a roof covering) are made of slightly combustible materials.

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Fire walls may not penetrate roof covering if all elements of the roof with or without the attic, with the exception of the roof covering, are made of noncombustible materials.

Section 3.7. Fire walls arrangement: Fire walls in buildings with exterior walls made with the use of combustible or slightly combustible materials shall cross these walls and extend beyond the exterior face by not less than 30 cm.

Where exterior walls are constructed of noncombustible materials with strip glazing, fire walls shall separate glazing. Fire wall may not extend beyond the outside face of the exterior wall.

Fire wall design: SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch. 7, Sec. 7.15. – Editor

Section 3.8. Largest fire compartment: Where the building is divided into fire compartments, the largest compartment shall have fire walls dominating throughout the building. Windows, doors, and gates with unspecified fire resistance rating may be provided in fire walls at not more than 8 m above the roof and 4 m from the wall of the adjacent compartment.

Section 3.9. Vents and smoke exhaust ducts may be installed within the fire wall assembly, provided that a fire resistance rating on each side of the duct shall not be less than 2.5 hr.

Section 3.10. Fire resistant partitions in rooms with suspended ceilings shall extend to the underside of the floor slab above.

Section 3.11. Fire walls arrangement: Where fire walls or fire partitions intersect at the angle, the distance between the nearest edges of openings in exterior portion of walls shall not be less than 4m. Portions of walls, cornices, and roof overhangs adjacent to a fire wall shall be constructed of noncombustible materials to the extent of not less than 4 m from the wall. Fire rated doors and windows of Type 2 shall be used where this distance is less than 4 m.

Section 3.12. Fire rated slabs shall adjoin exterior walls constructed of noncombustible materials without gaps. Fire rated slabs in buildings with exterior walls spreading flame, or with glazing at the floor level, shall cross these walls and glazing.

Section 3.13. Fire compartments: Instead of fire walls, it is allowed to provide fire compartments of Type 1 to divide buildings into fire compartments in cases described in appropriate SNIP codes.

The fire compartment of Type 1 shall be constructed as an insert dividing the building over the whole width (length) and height. The insert is a part of the building formed by fire walls of Type 2 which separate the insert from other fire compartments. The minimum compartment width shall not be less than 12 m.

No combustible gases, liquids, and materials shall be used or stored in rooms within the fire compartment. Processes resulting in formation of combustible dusts shall not be applied within the fire compartments.

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Insulation made of slightly combustible materials and the roof covering of combustible materials may be used for roofing of fire compartments in compliance with the requirements of Section 3.6.

Openings within fire rated walls of the fire compartments shall have fire rated opening protectives according to Section 3.17.

Section 3.14. Canceled.

Section 3.15. Structural concepts of fire compartments in buildings shall be assumed according to SNIP 2. 09.03-85, *Buildings of Industrial Enterprises*.

Section 3.16. Fire walls and compartments shall retain their functions in case of failure of structural elements adjacent thereto.

Section 3.17. Opening protectives: Openings within fire barriers shall have fire rated opening protectives or smokeproof vestibules. The total area of openings in a fire barrier, with the exception of elevator shaft enclosures, shall not exceed 25% of the barrier area. Fire doors and gates in fire barriers shall have gasketed frame ledges and self-closing devices. Fire rated windows shall be nonoperable.

Section 3.18. Smokeproof vestibules: The doors of smokeproof vestibules on the side of rooms where no combustible gases, liquids, and materials are used and stored as well as no processes resulted in formation of combustible dusts are present, may be constructed of not less than 4 cm thick solid combustible materials.

Smokeproof vestibules shall be pressurized in accordance with SNIP 2.04.05-91, Heating, Ventilation, and Air Conditioning.

Section 3.19. Penetrations: Fire rated walls, compartments, and slabs of Type 1 shall not be penetrated by channels, ducts, shafts, and pipelines transporting combustible gases, dust-and-air mixes, liquids, substances, and materials.

Section 3.20. Penetration of fire rated walls, compartments, and slabs of Type 1 by ducts, shafts, and pipelines which carry media different from specified in Section 3.19, with the exception of pipelines of water supplies, sewerage, and heating systems, shall be protected by automatic firestop devices in order to prevent fire propagation along the ducts, shafts, and pipelines.

Section 3.21. Enclosures of elevator shafts, elevator machine rooms, ducts, shafts, and niches for utility lines shall comply with the requirements for fire partitions of Type 1 and slabs of Type 3.

Where provision of fire rated doors in enclosures of elevator shafts is impractical, vestibules or lobbies enclosed by fire partitions of Type 1 and slabs of Type 3 shall be provided.

Section 3.22. Penetration of fire barriers by air ducts shall comply with the requirements of SNIP 2.04.05-91, *Heating, Ventilation, and Air Conditioning*.

Chapter 4. EVACUATION OF PEOPLE FROM ROOMS AND BUILDINGS

Section 4.1. General: All means of egress shall ensure safe evacuation of all occupants of the building through evacuation exits.

Section 4.2. Classification of exits: refer to SNIP 21-01-97, *Fire Safety of Buildings and Structures, Ch. 6, Sec. 6.9 for classification of evacuation exits.* – Editor.

Where two staircases discharge to the common vestibule, one of them, in addition to the exit through the vestibule, shall lead directly to the outside.

Exit to the outside may be provided through vestibules.

Section 4.3. Number of exits: At least two evacuation exits shall not be provided for each building, story, and room thereof, unless otherwise specified in appropriate SNIP codes.

Evacuation exits shall be arranged remote from one another. The minimum distance between the most distant evacuation exits from the room shall be calculated as follows:

L is more or equal **1.5** where L is the minimum distance and P is the room perimeter.

Section 4.4. Number of exits: One evacuation exit shall be permitted from any space located in the basement or semi-basement having the area of not more than 300 m² and permanent occupancy of not more than 5 persons. A second exit through the hatch of not less than 0.6x0.8 m in size with a vertical ladder, or through the window of not less than 0.75x1.5 m in size equipped with an exit device, may be provided if the occupancy is 6-15 persons.

Section 4.5. Exits from basements and semi-basements shall lead directly to the outside, with the exception of cases specified in appropriate SNIP codes.

Section 4.6. The clear width of egress paths shall not be less than 1 m. All doors required as exits shall not be less than 0.8 m in width.

Refer to SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch.6, Sec. 6.27 for minimum widths and heights. – Editor

Where doors are swinging into public corridors, the width of egress paths along the corridor shall be assumed as the width of the corridor reduced by the

- Half-width of the door where doors are arranged on one side of the corridor
- Full width of the door where doors are arranged on both sides of the corridor

The minimum headroom of egress paths shall not be less than 2 m.

The permitted travel distance of egress paths shall comply with the provisions of appropriate SNIP codes.

Section 4.7. Elevation changes: It is not permitted to arrange changes of floor elevation of less than 45 cm on egress paths. Projecting elements, with the exception of door sills in door openings, are prohibited. Where changes in elevation exist, stairs with the number of risers not less than three, or ramps having a grade not steeper than 1:6, shall be used.

Section 4.8. Built-in cabinets: In the public corridors there shall be no built-in cabinets, with the exception of communication and fire hose cabinets.

Section 4.9. Restrictions: Winders, spiral stairs, sliding doors, overhead doors and gates, revolving doors, and turnstiles shall not be permitted on egress paths.

Section 4.10. Lobbies: Room for security guards, open cloakroom, and vending outlets may be located in lobbies.

Section 4.11. Staircases: It is prohibited to place the following elements in staircases:

- Rooms or spaces of any use.
- Gas pipelines, steam pipelines, and pipelines carrying combustible liquids.
- Electric cables and wires, with the exception of wiring for corridors and staircases lighting.
- Exits from freight elevators and dumbwaiters.
- Refuse chutes.
- Equipment projecting from the wall surface within a distance of 2.2 m above the surface of treads or stairway landings.

The installation of refuse chutes and electric wiring for lighting of other rooms is allowed in staircases of buildings up to 26.5 m (*28 m as specified in SNIP 21-01-97, Fire Safety of Buildings and Structures, Ch. 6, Sec. 6.32. – Editor*)

Not more than two passenger elevators reaching not lower than the ground level may be located in staircases, with the exception of smokeproof staircases.

Section 4.12. Swing of doors: All doors on egress paths shall swing in the direction of exit travel from the building with the following exceptions:

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- Balconies, loggias (with the exception of the doors leading to the outside from smoke-free staircases of Type 1), and to exterior evacuation stairs.
- Spaces with occupancy of not more than 15 persons.
- Storage rooms having area of not more than 200 m².
- Bathrooms.

Swing of doors: refer to SNIP 21-01-97, *Fire Safety of Buildings and Structures*, Ch. 6, Sec. 6.17.- Editor

Section 4.13. Clear height of the exit doors on egress paths shall not be less than 2 m.

Clear height of doors and passageways leading to spaces with no permanent occupancy as well as to the basement, semi-basement, and service stories may be reduced to 1.9 m. Clear height of doors leading to the roof with or without attics may be reduced to 1.5 m.

Exit heights: refer to SNIP 21-01-97, *Fire Safety of Buildings and Structures*, Ch. 6, Sec. 6.16, 6.27, 8.5.- Editor

Section 4.14. Accessibility: Outside exit doors shall be so arranged as to be readily opened without the use of a key from inside.

Section 4.15. Doors of staircases leading to public corridors, doors of elevator lobbies, and smokeproof vestibules shall be equipped with self-closing devices and gaskets in frame ledges, and shall be readily opened without the use of a key from inside.

These doors, with the exception of apartments, in buildings of more than four stories in height shall be of solid construction, or shall use reinforced glass.

The minimum width of exterior doors of staircases and doors leading from staircases to lobbies shall not be less than the flight's width.

Swing doors leading to a staircase, in the open position, shall not reduce the required stairway width and depths.

Section 4.16. Classification of stairs: Stairways and staircases used as means of egress shall be classified as follows:

- **Type 1:** interior stairways enclosed in staircases
- **Type 2:** interior open stairways
- **Type 3:** exterior open stairways

Ordinary staircase Types:

- **Type 1:** with natural lighting through openings in exterior walls with or without opening protectives
- **Type 2:** without natural lighting through openings in exterior walls or skylights

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Smoke-free staircase types:

- **Type 1:** with access to the staircase from floors through exterior air zone through open balconies, loggias, passageways, and galleries
- **Type 2:** with a staircase pressurized in case of fire
- **Type 3:** with access to the staircase from floors through pressurized vestibules

These stairs and staircases shall be used in compliance with the requirements of appropriate SNIP codes.

Section 4.17. Minimum dimensions: The width of a flight of the stair shall not be less than the width of the exit door leading to the staircase.

The minimum depth of landings shall not be less than the required width of the flights. If the landing is serving as the elevator lobby for swing-door elevators, its depth shall not be less than the sum of the flight's width and the half elevator door's width, but not less than 1.6 m.

A clear gap of not less than 50 mm wide shall be provided between flights of stairs.

Section 4.18. Escalators: Design of escalators shall comply with the requirements for stairs according to Section 4.19.

Section 4.19. Stairways connecting the ground level lobby to the second level in buildings of Degrees I and II of fire resistance shall be of Type 2. Lobbies shall be separated from adjacent corridors and rooms by fire partitions of Type 1.

Section 4.20. Special stairs: Stairs of Type 3 intended for use as the second evacuation exits shall be of noncombustible materials and shall be connected with floors through landings or balconies at the level of exit. These stairs shall have a grade of not more than 1:1, and shall not be less than 0.7 m in width. The exit doors to the stairs of Type 3 shall not have locks or bolts from the outside.

Section 4.21. Openings: Provision of openings other than the exit doors in the interior walls of staircases is not permitted.

Operable windows of not less than 1.2 m² in area shall be provided at each floor in the walls of staircases made of glass blocks.

Section 4.22. Elevator shafts in buildings with smoke-free staircases shall be provided with air pressurization in case of fire in accordance with SNIP 2.04.05-91, *Heating Ventilation, and Air Conditioning*. Exits from these shafts shall be provided through elevator lobbies separated from adjacent spaces by fire rated partitions of Type 1. Provision of fire doors in elevator shaft enclosures is not required.

Section 4.23. Smoke-free staircases within the limits of the first floor shall have exits directly to the outside. Smoke-free staircases of Type 1 shall connect to the first floor through the outside air zone.

Section 4.24. Smoke exhaust from public corridors shall be at each floor in buildings with smokeproof staircases according to SNIP 2.04.05-91, *Heating Ventilation, and Air*

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Conditioning. Public corridors shall be divided by fire partitions of Type 2 into compartments every 60 m of the corridor's length.

In buildings equipped with fire-suppression and fire alarm devices, where fire doors shall normally remain in open position, automatic closing devices shall be provided.

Section 4.25. Balconies, terraces, and galleries leading to smoke-free staircases of Type 1 shall not be less than 1.2 m in width and shall be equipped with 1.2 m high guardrails.

Minimum distance between centers of door openings in the outside air zones shall not be less than 2.2 m.

Section 4.26. Elevators and other mechanical means of transportation shall not be considered as means of egress.

One of the elevators may be equipped for use by the fire department in the cases specified in appropriate SNIP codes.

Section 4.27. Passenger elevators located in staircases are allowed to be enclosed with metal screens, reinforced glass partitions, and other noncombustible materials with unspecified fire-resistance rating. Elevators installed outside of buildings shall be enclosed by walls of noncombustible materials with unspecified fire-resistance rating.

Section 4.28. Fire warning systems: All buildings shall be provided with fire warning systems. The method of warning (technical means or organizational measures) shall be determined according to building functions and spaceplanning and structural concept thereof.

Appendix 1. METHOD OF FLAME SPREAD TESTING OF BUILDINGS COMPONENTS

This method establishes a procedure of determining the flame spread limit on the surface of building components and elements (further on in the text as “components”) thereof during the tests.

The flame spread limit for components fully made of noncombustible materials shall be assumed as zero without testing.

1.Scope.

The flame spread test of the building component shall determine the amount of damage as a result of burning within a control zone beyond the area of the direct application of the thermal load. Flame spread rating of the component shall be determined by the tests of specimens in a test furnace.

2.Test specimen:

2.1. A test specimens of the components shall be fabricated according to working drawings and manufacturer’s specifications.

2.2. Specimens of components of enclosures shall not be less 2x2 m in size. The length of a linear-type specimen shall accommodate a secure attachment thereof according to diagrams presented in Fig.3 and 4.

2.3. Moisture content of specimen materials shall be dynamically balanced by maintaining relative humidity at $60 \pm 15\%$ and temperature at $20 \pm 10^\circ\text{C}$.

2.4. Specimens with ribs and projections shall be placed in the furnace so that they do not prevent flame spread in the control zone.

3.Test procedures:

3.1. The flame spread tests of a specimen shall be conducted by applying thermal loads locally according to ST SEV 1000-78.

3.2. Flame spread on the surface of loadbearing components (floors, roofs, columns, etc.) shall be determined by the tests of unloaded specimens.

3.3. The tests shall be conducted at initial temperature of $20 \pm 10^\circ\text{C}$ and air velocity of not more than 0.5 m/s^{-1} , with the exception of cases where actual performance of a component requires special testing. The temperature in the room, furnace, and of the test specimen shall be stabilized 2 hr before the beginning of the test.

3.4. The joints of slabs and panels of the components of enclosures shall run through both the area of flame application and the control zone.

3.5. Installation of a specimen in the fire furnace and arrangement of thermocouples shall be conducted according to a diagram in Figures 1 through 4. A gap between the specimen's heated surface and the furnace's exterior surface shall be 5 ± 0.5 cm.

3.6. Thermal loads shall be applied for not less than 15 minutes ± 30 seconds. After the flame in the furnace shall be extinguishing, and not later than in 2 min the specimen shall be removed from the furnace. Alternatively, a thermal screen may be inserted between the specimen and the source of thermal loads.

3.7. Inspection of the specimen and measurement of damages in the control zone shall be performed after complete cooling thereof.

3.8. During the test, specimens of enclosures, landings, and flights shall be exposed to thermal loads on one side.

External and internal walls (including partitions) with an asymmetrical section (different finishes or enclosures) shall be tested separately on either side.

Slabs, floor finishes, roof decks, and suspended ceilings shall be tested by applying thermal loads from underside.

Specimens of external and internal walls (including partitions), landings, and flights are allowed to be tested on the side only with the deliberately higher flame spread limit.

3.9. Specimens of linear-type components shall be exposed to fire on three or four sides depending on the operation conditions. Test specimens of treads and risers shall be assembled into flights.

3.10. The control zone shall not be less than 0.75 m in either direction.

3.11. During the tests, the following conditions shall be controlled:

- Temperature inside the furnace.
- Time of appearance and nature of development of cracks, holes, and splits in the specimen.
- Time and place of failure of joints of slabs, panels, and other elements.
- Appearance of smoke, flame, discoloration, changes of structure of materials, etc.

4. Conditions of acceptance:

4.1. The flame spread limit shall be assumed as the size of the damaged area of a specimen. The area shall be measured from the point of application of thermal loads perpendicular to the most distant point of damage (for vertical components – upwards, for horizontal ones – on either side). The measurement results shall be rounded up to 1 cm toward increase. A zero flame spread limit shall be considered where the size of damage within the control zone does not exceed 5 cm for vertical and 3 cm for horizontal components.

To measure the extent of damage of laminated components, all layers shall be inspected separately.

4.2. The material shall be regarded as damaged if the test is resulted in charring and burning-out of a material (or fusion of thermoplastic material). The damage of vapor barrier layers less than 2 mm thick shall not be accounted.

4.3. In determining flame spread limits, the results of the tests of two equal identical specimens shall be considered. The flame spread limit on the surface of components is calculated as arithmetic average of test results of not less than two specimens. The indices of the highest and the lowest flame spread limits for two tested specimens shall not differ from the higher value by more than 15%. If the results differ by more than 15%, additional tests shall be conducted. Where a test is performed on one specimen only, the test result shall be multiplied by 1.2 to specify the flame spread limit.

5. The test records shall include following data:

- Name of the organization conducted tests.
- Name of the client.
- Name of the product with reference to manufacturer's specifications.
- Date of the test.
- Title of the regulatory document used for the tests.
- Shop drawings and technical specifications for specimens.
- Data on meteorological conditions during the tests.
- Description of the side of application of thermal loads for asymmetrical interior walls and partitions.
- Description of the specimen's behavior during the tests.
- A record of parameters checked including readings of thermocouples and results of analysis thereof.
- Measurement results of the damages in the control zone.
- Conclusion with indication of the flame spread limit on the surface of the component.
- Photo of the component in the course and after the tests, and, if necessary, after exposure of internal layers.

Appendix 2. CLASSIFICATION OF BUILDINGS BY DEGREE OF FIRE RESISTANCE

Degree of fire resistance	Structural characteristics by construction type
I	Buildings with loadbearing and enclosing components fabricated of Natural (or artificial) stone materials and concrete (or reinforced concrete) using noncombustible sheets and plates.
II	Same as above. Unprotected steel components may be used in building roof assemblies.
III	Buildings with loadbearing and enclosing components fabricated of natural (or artificial) stone materials and concrete (or reinforced concrete). Wood components protected by plaster or slightly combustible sheets or plates may be used in slab assemblies. No fire resistance and flame spread limits are applicable to fire-retardant treated roof assemblies. Buildings with primarily frame structural systems with frame elements of <u>unprotected steel</u> . Exterior enclosures shall be of steel shaped sheets or other noncombustible sheet materials with slightly-combustible insulation. Primarily one-story buildings with frame structural systems. All frame elements shall be of solid or laminated wood with fire-proofing to ensure the required flame spread rating. Enclosing components shall be made of panels or element-by-element assembly with the use of wood or wood-based materials. Wood and other combustible materials of enclosing components shall have fire-proofing and shall be protected against fire and high temperatures so that to ensure the required flame spread rating.
IV	Buildings with loadbearing and enclosing components fabricated of solid or laminated wood and other combustible or lightly-combustible materials protected against fire and high temperatures by plaster or sheets (plates). No fire resistance and flame spread limits are applicable to fire-retardant treated roof assemblies provided that wood attic roofs are treated with fire-retardant.
IVA	Primarily one-story buildings with frame structural systems with frame elements of unprotected steel. Exterior enclosures shall be of steel shaped sheets or other noncombustible materials with combustible insulation,
V	Buildings with loadbearing and enclosing components having non-specified fire resistance and flame spread ratings.

Note: Building components of buildings listed in this Appendix shall meet the requirements of Table 1 and other sections of this Code.