

FIRE SAFETY OF BUILDINGS AND STRUCTURES

SNIP 21-01-97

PREFACE

1. DEVELOPED by the State Central Research and Experimental Design Institute of Integrated Problems of Building Components and Structures named after V.A.Kucherenko (Kucherenko TsNIISK), the Center of Fire Research and Thermal Protection in Construction of TsNIISK (AO "TsPITZS TsNIISK"), the Central Research and Experimental Design Institute of Industrial Buildings and Structures (AO "TsNIIpromzdanii") and the All-Russia Research Institute of Fire Defence (VNIPO) with participation of the territorial bodies of the State Fire Surveillance of Russia's Ministry of Internal Affairs.
2. INTRODUCED by the Directorate of Technical Regulation of Russia's Ministry.
3. ADOPTED AND PUT INTO EFFECT from January 1, 1998 by the resolution of Russia's Ministry No.18-7 of 13.02.97.
4. INSTEAD OF SNiP 1.01.02-85*.
5. The present building codes and rules provide an authentic text of the Inter-State Building Codes MSN 2.02-01-97 "Fire Safety of Buildings and Structures".

RESOLUTION

of the Ministry of Construction of the Russian Federation
No.18-7 of February 13, 1997

On adoption of state building codes and rules "Fire Safety of Buildings and Structures"

1. To adopt and to put into effect from 1 January 1998 the state building codes and rules SNiP 21-01-97 "Fire Safety of Buildings and Structures" developed by Kucherenko TsNIISK, GNTs "Construction" and the Center of Fire Research and Thermal Protection in Construction of TsNIISK" and introduced by the Directorate of Technical Regulation of Russia's Ministry.
2. To recognize SNiP 2.01.02-85* "Fire Code" as invalid from January 1, 1998 on the territory of the Russian Federation.
To establish that those provisions of SNiP 2.01.02-85* which serve a basis for the requirements of building codes and rules for design of buildings and structures and utility systems intended for various purposes, continue to be valid until the building codes for these and structures are revised.

Minister Ye.V.Basin

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CONTENTS

- Preface
- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 4 Basic provisions
- 5 Fire-Engineering Classification
 - General provisions
 - Building materials
 - Building components
 - Fire separations
 - Stairs and staircases
 - Buildings, fire compartments, spaces
- 6 Human safety assurance
 - General provisions
 - Fire escapes and emergency exits
 - Means of egress
 - Evacuation by stairs and staircases
- 7 Fire spread prevention
- 8 Fire-fighting and rescue operations

INTRODUCTION

The present codes and rules are developed in conformance with the requirements of SNiP 10-01, recommendations of international organizations for standardization and regulation and are a fundamental document of the complex 21 "Fire Safety" in the System of Normative Documents in Construction.

The principal differences of this complex and the present codes and the rules from SNiP 2.01.02-85* "Fire Code" and related documents on fire safety assurance in construction are:

- priority of the requirements aimed at assurance of human safety in fire as compared to other fire requirements;
- applicability of the requirements to projects under protection at the stages of design, construction and operation including renovation, repair and change of functional purposes;
- stating of principal requirements to fire protection of buildings and structures in the form of purposes of this protection;
- maximum possible reduction of descriptive requirements to means and methods of fire safety assurance;
- substantial development of the classification basis of fire regulation for more objective and differentiated account of the functional purpose of buildings and structures, occupants' responses as well as reactions of components and materials the buildings and structures are made of, to occurrence and propagation of fire and for expansion of variance and increasing adequacy of the selection of fire protection means and methods against fire hazards.

The present codes give fire requirements subject to mandatory observance; when a possibility of deviation from any requirement is expected, then it is stated with reserve "as a rule" and with conditions which allow the deviations.

Practically tested means and methods of assuring fire requirements given in the present norms, are stated in the code being under development at present, in the first turn, in SP 21-101 “Assurance of Human Safety” and in SP 21-102 “Fire Spread Prevention”.

Renewal of the system of normative documents in construction is not a simultaneous process. Many current SNiPs and other normative documents comprise fire requirements and rules based on provisions of SNiP 2.01.02. Therefore when putting the present code into effect, it is established that those provisions of SNiP 2.01.02 serving a basis for the requirements of building codes and rules referring to specific types of building products – buildings, structures, utility systems, components and materials, continue to be valid until the above codes and rules are revised.

In the transitional period the technical documents for these types of building products can simultaneously comprise fire-engineering characteristics regulated both by SNiP 2.01.02 and the present code.

One does not rule out a possibility of using the documents of the complex 21 and the present code for those product types the norms for which were put into effect earlier. It is also necessary to consider that both the system of fire protection of buildings and structures based on provisions of SNiP 2.01.02 shall be used integrally for the project as a whole, but not for its individual parts or individual means and methods of protection.

It should be also noted that introduction of new standards for the methods of determining fire-engineering indices of building products in most cases allows competent (accredited in the Certification System GOST R) organizations to establish these indices in compliance with the classification assumed in SNiP 2.01.02.

The present code is developed by Kucherenko TsNIISK (responsible executor, theme leader V.N.Zigern-Korn, Cand. Sc.(Eng.)), VNIPO (responsible executor I.S.Molchadsky, D.Sc.(Eng.)), TsNIIpromzdanii (responsible executor M.Ya>Roitman, Cand.Sc.(Eng.)) under the guidance of the Directorate of Standardization, Technical Regulation and Certification of Russia’s Minstroi (G.M.Khorin, N.N.Polyakov) and the Main Directorate of State Fire Service of Russia’s Ministry of Internal Affairs (Ye.Ye.Kiryukhantsev, Yu.M.Kondrashin, V.Ye.Tatarov).

BUILDING CODES AND RULES OF THE RUSSIAN FEDERATION

FIRE SAFETY OF BUILDINGS AND STRUCTURES

Date of putting into effect 1998-01-01

1. SCOPE

1.1 The present codes and rules establish general requirements of fire protection to spaces, buildings and other structures (below – buildings) at all stages of their creation and operation as well as the fire-engineering classification of buildings, their elements and parts, spaces, building components and materials.

1.2 Sections 6, 7 and 8 do not extend to special-purpose buildings (for manufacture and storage of explosives and blasting supplies, for military purposes, underground structures of subways, mine workings).

1.3 Normative and technical documentation for buildings, structural components, products and materials shall comprise their fire-engineering characteristics regulated by the present code.

1.4 Fire norms and requirements of the system of normative documents in construction shall be based on the requirements of the present code.

Along with the present code one shall observe the fire requirements stated in other normative documents approved in the established procedure.

1.5 For buildings not regulated by fire norms as well as for buildings of the functional fire hazard class $\Phi 1.3$ over 75 m* high, buildings of other functional fire hazard classes over 50 m high and buildings with the number of underground storeys over one, as well as for especially complex and unique buildings in addition to observance of the present code one should develop specifications reflecting specific features of their fire protection including a complex of additional engineering-technical and organizational measures. These specifications shall be coordinated with a management body of the State Fire Service of Russia's Ministry of Internal Affairs and with Russia's Gosstroy and be approved by client.

1.6 Permissions for deviations from the requirements of the present code to specific projects in justified cases are issued by Russia's Gosstroy, if measures are taken to compensate these deviations coordinated with a management body of the State Fire Service of Russia's Ministry of Internal Affairs.

1.7 When changing functional purposes of existing buildings or individual spaces in them, one should use current normative documents in conformance with the new purpose of these buildings or spaces.

The necessity of bringing the existing buildings in conformity with the present code is determined by 8.5 of SNiP 10-01.

2. NORMATIVE REFERENCES

The present code uses references to the following normative documents:

SNiP 10-01-94 System of Normative Documents in Construction. General Provisions.

* Here and below, except specially reserved cases, the building height is determined by the upper storey location height, not counting the top utility services storey, while the storey location height is determined

by the difference of elevations of the fire engine driveway surface and the lower limit of an opening in the external wall.

SNiP 2.01.02-85* Fire Code.

SNiP 2.04.05-91* Heating, Ventilation and Air Conditioning.

SNiP 23-05-95 Natural and Artificial Lighting.

SNiP 2.07.01-89* Urban Development. Planning and Development of Urban Rural Settlements.

SNiP II-89-80* Master Plans of Industrial Plants.

SNiP II-97-76 Master Plans of Agricultural Facilities.

GOST 12.1.033-81 SSBT. Fire Safety. Terms and Definitions.

GOST 12.1.044-89 SSBT. Fire-Explosion Hazard of Substances and Materials. Nomenclature of Indices and Methods of Indices and Methods of Their Determination.

GOST 25772-83 Steel Guardrails of Stairs, Balconies and Roofs. General Specifications.

GOST 30244-94 Building Materials. Methods of Combustibility Tests.

GOST 30247.0-94 Structural Components. Methods of Fire-Resistance Tests. General Requirements.

GOST 30247.1-94 Structural Components. Methods of Fire-Resistance Tests. Load-Bearing and Enclosing Components.

GOST 30247.2-97 Structural Components. Methods of Fire-Resistance Tests. Doors and gates.

GOST 30402-95 Building Materials. Methods of Flammability Test.

GOST 30403-96 Structural Components. Method of Fire Hazard Determination.

GOST 30444-97 (GOST R 51032-97) Building Materials. Method of Flame-Spread Test.

ST CMEA 383-87 Fire Safety in Construction. Terms and Definitions.

PPB 01-93 Fire Safety Rules in the Russian Federation.

NPB101-95 Design Code for Projects Protected Against Fire.

NPB 104-95 Design of Fire-Warning Systems in Buildings and Structures.

NPB 105-95 Categorization of Spaces and Buildings by Their Explosion-Fire and Fire Hazards.

NPB 110-96 List of Buildings, Structures, Spaces and Equipment To Be Protected With Automatic Fire-Detecting and Extinguishing Units.

3. TERMS AND DEFINITIONS

The present code assumes terms and definitions given in ST CMEA 383 and GOST 12.1.033, unless specified otherwise.

4. PRINCIPAL PROVISIONS

4.1 Buildings shall provide structural, spatial-planning solutions that ensure in fire:

a possibility of escape of occupants, irrespective of their age and physical condition, to outside, on the territory adjoining a building(bellow-outside) prior to appearance of the threat to their life and health due to effects of hazardous fire factors;

a possibility of rescuing the occupants;

a possibility of access of fire units' personnel and delivery of fire-fighting equipment to the fire hotbed as well as taking measures to rescue people and material values;

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non-spread of fire to neighboring buildings, also in case of collapse of burning building; limitation of direct and indirect material damage including the building's content and the building itself, under an economically substantiated ratio of the damage value and expenses for fire-control measures, fire safety and its technical assurance.

4.2 In the course of construction it is necessary to insure:

priority implementation of fire-prevention measures envisaged by the design and developed in compliance with current codes and approved in the established procedure;

observance of the fire rules envisaged by PPB 01 and fire protection of projects under construction and those intended for auxiliary purposes, fire-safe conduction of building and erection works;

availability and serviceable maintenance of fire-extinguishing equipment;

a possibility of safe evacuation and rescue of occupants as well as protection of material values in case of fire of the project under construction and on the construction site.

4.3 In the course of operation one should:

ensure implementation of fire safety rules approved in the established procedure, including PPB 01;

not allow changes in structural, spatial-planning and engineering solutions without a design developed in compliance with current codes and approved in the established procedure;

when conducting repairs, not allow the use of components and materials that do not meet the requirements of current codes.

If a permit for construction of a building is obtained on condition that the number of occupants in the building or in any of its parts or the fire load are limited, then the notices about these limitations shall be placed conspicuously inside the building, while the building administration shall work out special organizational arrangements on fire prevention and escape of occupants in case of fire.

4.4 Fire-protection measures for buildings are provided with account of fire units' technical equipment and their location.

4.5 When analyzing the fire hazard of buildings, one may use design scenarios based on the ratio of temporary parameters of development and spread of fire hazardous factors, evacuation of occupants and fire control.

5. FIRE-ENGINEERING CLASSIFICATION

GENERAL PROVISIONS

5.1 The fire-engineering classification of building materials, components, spaces, buildings, elements and parts of buildings is based on their division by the properties facilitating of hazardous factors of fire and its development- **fire hazard**, and by the properties of resistance to fire effects and spread of its hazardous factors- **fire-resistance**.

5.2 The fire-engineering classification is intended for establishment of the necessary requirements to fire protection of components, spaces, buildings, elements and parts of buildings with regard to their fire-resistance and/or fire hazard.

BUILDING MATERIALS

5.3 Building materials are characterized by the fire hazard only.

Fire hazard of building materials is determined by the following fire-engineering characteristics: combustibility, flammability, surface flame spread, smoke-forming ability and toxicity.

5.4 Building materials are subdivided into non-combustible (НГ) and combustible (Г).

Combustible building materials are subdivided into four groups:

- Г1 (low-burning);
- Г2 (moderate-burning);
- Г3 (normal-burning);
- Г4 (high-burning).

Combustibility and groups of building materials by combustibility are established according to GOST 30244.

For non-combustible building materials other indices of fire hazard are not determined and are not rated.

5.5 Combustible building materials by flammability are subdivided into three groups:

- B1(hardly flammable);
- B2(moderately flammable);
- B3(easily flammable).

Groups of building materials by flammability are established according to GOST 30402.

5.6 Combustible building materials by surface flame spread are subdivided into four groups:

- ПП1(non-spreading);
- ПП2(slow-spreading);
- ПП3(moderate-spreading);
- ПП4(fast-spreading).

Groups of building materials by flame spread are established for surface layers of roofs and floors including carpet covers, according to GOST 30444 (GOST R 51032-97).

For other building materials surface flame spread groups are not determined and not rated.

5.7 Combustible building materials by their smoke-forming ability are subdivided into three groups:

- Д1(with low smoke-forming ability);
- Д2(with moderate smoke-forming ability);
- Д3(with high smoke-forming ability).

Groups of building materials by their smoke-forming ability are established according to 2.14.2 and 4.18 of GOST 12.1.044.

5.8 Combustible building materials by toxicity of combustion products are subdivided into four groups:

- T1(low-hazardous);
- T2(moderate hazardous);
- T3(high-hazardous);
- T4(extremely hazardous).

Groups of building materials by toxicity of combustion products are established according to 2.16.2 and 4.20 of GOST 12.1.044.

STRUCTURAL COMPONENTS

5.9 Structural components are characterized by fire-resistance and fire-hazard.

The index of fire-resistance is a fire-resistance rating, the fire hazard of a component is characterized by a class of its fire hazard.

5.10 Fire-resistance rating of structural components is established by the time (in minutes) of appearance of one or several successive indicators of limit states to be rated for this component:

- loss of bearing capacity (R);
- loss of integrity (E);
- loss of heat-insulating value (I).

Fire-resistance ratings of structural components and their symbols are established according to GOST 30247. The fire resistance rating of windows is established by the time of the loss of integrity (E) appearance.

5.11 By their fire hazard structural components are subdivided into four classes:

- K0 (non-fire-hazardous);
- K1 (low-fire-hazardous);
- K2 (moderate-fire-hazardous);
- K3 (fire-hazardous).

A class of fire hazard of structural components is established according to GOST 30403.

FIRE SEPERATIONS

5.12 Fire separations are intended for prevention of fire and combustion products spread from a space or a fire compartment with a fire hotbed into other spaces.

Referred to fire separations are fire walls, partitions and floors.

5.13 Fire separations are characterized by fire-resistance and fire hazard.

Fire-resistance of a fire separation is determined by fire-resistance of its elements:

- enclosing part;
- components ensuring stability of fire separation;
- components it rests upon;
- fixing joints between them.

Fire- resistance ratings of the components ensuring stability of the separation, the components supporting it, and the fixing joints between them according to value R shall be not less than the required fire-resistance rating of the fire separation's enclosing part.

Fire hazard of a fire separation is determined by fire hazard of its enclosing part with fixing joints and of components ensuring stability of the separation.

5.14 Depending of fire-resistance of their enclosing part, fire separations are subdivided into types according to Table 1, opening fills in the fire separations – Table 2, vestibule-locks provided in openings of fire separations – Table 3.

Vestibule-lock partitions and ceilings shall be fire-resistant.

Fire separations of the 1st type shall be of class K0. In specially reserved cases it is allowed to use fire separations of the 2nd-4th types of class K1.

Table 1

Fire separations	Type of fire separations	Fire-resistance rating of fire separation, at least	Type of opening fill, not lower than	Type of vestibule -lock, not lower than
Walls	1	REI 150	1	1
	2	REI 45	2	2
Partitions	1	EI 45	2	1
	2	EI 15	3	2
Floors	1	REI 150	1	1
	2	REI 60	2	1
	3	REI 45	2	1
	4	REI15	3	2

Table 2

Opening fills in fire separations	Type of opening fills in fire separations	Fire-resistance rating, at least
Doors, gates, hatches, valves	1	EI 60
	2	EI 30
	3	EI 15
Windows	1	E 60
	2	E 30
	3	E 15
Curtains	1	EI 60

Table 3

Type of vestibule-lock	Types of vestibule-lock elements, not lower than		
	Partitions	Floors	Opening fills
1	1	3	2
2	2	4	3

STAIRS AND STAIRCASES

5.15 Stairs and staircases intended for escape are subdivided into **stairs** of the types:

1- internal stairs, located in staircases;

2- internal open stairs;

3- external open stairs;

common staircases of the types:

J1 – with glazed or non-filled openings in external walls on each floor;

J2 – with artificial lighting through glazed or non-filled openings in the roof;

pressurized staircases of the types:

H1 – with entrance to the staircase from the floor through an external air zone in open passages; pressurization of the passage through an air zone shall be provided;

H2 – with an excess air pressure into the staircase in fire;

H3 – with entrance to the staircase from the floor through a vestibule-lock.

5.16 To ensure fire-extinguishing and rescue operations **fire escape ladders** of the following types are provided:

П1- vertical;

П –flight stairs with gradient not more than 6:1.

BUILDINGS, FIRE COMPARTMENTS, SPACES

5.17 Buildings as well as parts of buildings isolated with fire walls, - fire compartments (bellow – buildings) – are subdivided by fire-resistance degrees, by classes of structural and functional fire hazard. For isolation of fire compartments the fire walls of the 1 st type are used.

The fire-resistance degree of a building is determined by fire-resistance of its structural components.

A class of a building's structural fire hazard is determined by fire-resistance of its structural components into fire development and formation of its hazardous factors.

A class of functional fire hazard of a building and its parts is determined by their purpose and the features of production processes located in them.

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5.18 Buildings and fire compartments are subdivided by **fire-resistance degrees** according to Table 4.

Table 4

Fire-resistance degree of building	Fire-resistance of structural components, at least					
	Load-bearing elements of building	External walls	Inter-storey floors (including attic and basement floors)	Open roofs	Stair cases	Internal walls
I	R 120	RE 30	REI 60	RE 30	REI 120	R 60
II	R 90	RE 15	REI 45	RE 15	REI 90	R 60
III	R 45	RE 15	REI 45	RE 15	REI60	R 45
IV	R 15	RE 15	REI15	RE 15		
		Not rated				

To load-bearing elements of building one refers components ensuring its general stability and geometrical invariability in fire – bearing walls, frames, columns, beams, cross-bars, trusses, arches, braces, stiffening diaphragms, etc/

Fire-resistance ratings of opening fills (doors, gates, windows and hatches) are not rated, except those particularly specified and opening fills in fire separations.

When the minimum required fire-resistance rating of a component is specified as R 15 (RE 15, REI 15), it is allowed to use unprotected steel components irrespective of their actual fire-resistance rating, except the cases when the fire-resistance rating of a building's bearing elements is less than R 8 according to test results.

5.19 Buildings and fire compartments by **their structural fire hazard** are subdivided into classes according to Table 5.

The fire hazard of opening fills in enclosing components of buildings (doors, gates, windows and hatches) is not rated, except the particularly specified cases.

Table 5

Class of building's structural fire hazard	Class of fire hazard of structural components, at least				
	Lattice elements (columns, cross-bars, trusses, etc.)	External walls from outside	Walls, partitions, floors and open roofs	Walls of staircases and fire separations	Stair flights and landings
C 0	K 0	K 0	K 0	K 0	K 0
C 1	K 1	K 2	K 1	K 0	K 0
C 2	K3	K 3	K 2	K 1	K 1
C 3	Not rated			K 1	K 3

5.20 When introducing into construction practice the structural systems of buildings which cannot be unambiguously referred to a certain fire-resistance degree or a class of structural fire hazard, one would conduct fire tests of full-size fragments of buildings.

5.21 Buildings and parts of buildings – spaces or groups of spaces functionally interconnected by their functional fire hazard are subdivided into classes depending on the method of their use and on what extent the safety of occupants is under the threat of fire, with account of their age, physical condition, a possibility of staying in the sleeping state, the type of the main functional contingent and its quantity:

Φ1 For permanent living and temporary (including a round-the-clock basis) staying of people (spaces in these buildings are used, as a rule, round the clock, the occupant contingent may have different age and physical conditions, these buildings are characterized by the availability of bedrooms);

Φ1.1 Pre-school children institutions, old people's and handicapped' homes, hospitals, dormitories of boarding schools and children's institutions;

Φ1.2 Hotels, hostels, dormitories of general-type sanatoriums and rest-homes, campings, motels and boarding-houses;

Φ1.3 Apartment buildings;

Φ1.4 Single-family house including row houses;

Φ2 Entertainment, cultural and educational institutions (main spaces in these building are characterized by mass staying of visitors in certain periods of time);

Φ2.1 Theatres, cinemas, concert halls, clubs, circuses, sports facilities with stands, libraries and other institutions with the design number of seats for visitors in closed spaces;

Φ2.2 Museums, exhibitions, dancing-halls and other similar institutions in closed spaces;

Φ2.3 Institutions mentioned in Φ2.1 in the open air;

Φ2.4 Institutions mentioned in Φ2.2 in the open air;

Φ3 Public service enterprises (spaces of these enterprises are characterized by greater numbers of visitors than that of the service personnel);

Φ3.1 Shops;

Φ3.2 Public catering enterprises;

Φ3.3 Railway stations;

Φ3.4 Polyclinics and out-patient clinics;

Φ3.5 Spaces for visitors of public services and communal utilities (post-offices, saving-banks, travel agencies, legal advice offices, notary offices, laundries, dress-sewing and footwear-repairing shops, dry cleaning, hairdresser's and barber's, etc. places of funeral rituals and worship) with unspecified number of seats for visitors;

Φ3.6 Complexes of physical culture and health improvement and sports-training facilities without spectators' stands, service spaces, baths;

Φ4 Educational institutions, scientific and design organizations, management institutions (spaces in these buildings are used for some time during the day, they have, as a rule, a permanent contingent of people of a certain age and physical state that got used to local conditions):

Φ4.1 Schools, extra-school educational institutions, secondary vocational schools, occupational-technical schools;

Φ4.2 Higher educational establishments, gualification upgrading institutions;

Φ4.3 Institutions of management bodies, design and engineering organizations, information and editorial-publishing organizations, research organizations, banks, offices;

Φ4.4 Fire stations;

Φ5 Production and storage buildings, structures and spaces (the spaces of this class are characterized by the presence of a permanent contingent of employees, including a round-the-clock basis):

Φ5.1 Production buildings and structures, production and laboratory spaces, workshops;

Φ5.2 Storage buildings and structures, vehicle parkings without technical maintenance and repair, book depositories, archives, storage spaces;

Φ5.3 Agricultural buildings.

Production and storage buildings and spaces by explosion-fire and fire hazard with regard to the amount and fire-explosion-hazardous properties of substances and materials available (handled) in them and with account of the features of production processes housed in them are subdivided into categories according to NPB 105.

Production and storage spaces, including laboratories and workshops in buildings of classes Φ1, Φ2, Φ3 and Φ4 are referred to class Φ5.

6 HUMAN SAFETY ASSURANCE

GENERAL PROVISIONS

6.1 Requirements of the present section are aimed at:

Timely and unimpeded evacuation of occupants;

Rescue of occupants that may be exposed to hazardous fire factors;

Protection of occupants in the means of egress against effects of hazardous fire factors.

6.2 Evacuation is a process of the organized independent movement of people outside from spaces where they can be exposed to hazardous factors of fire. Evacuation should be also considered a non-autonomous movement of people referred to low-mobile groups of egress and fire escapes.

6.3 Rescue is a forced movement of people outside under exposure to hazardous factors of fire or in emergence of the direct threat of this exposure. The rescue is performed by occupants themselves, with the help of fire brigades or specially trained personnel including the use of rescue facilities, through fire escapes and emergency exits.

6.4 Occupant protection in the means of egress is ensured by a complex of spatial-planning, ergonomic, structural, engineering and organizational measures.

Means of egress within a space shall provide safe evacuation of occupants through fire escapes from this space without account of fire-extinguishing and smoke protection facilities used in it.

Outside the spaces protection of the means of egress should be provided on condition of ensuring safe evacuation with account of functional fire hazard of spaces opening to the means of egress, the number of those to be evacuated, the fire-resistance degree and the class of structural fire hazard of a building, the number of fire escapes from the floor and from the building as a whole.

Fire hazard of building materials forming surface layers of structural components (finishes and facings) in spaces and in the means of egress beyond the spaces shall be limited depending on the functional fire hazard of the space and the building with account of other measures to protect means of egress.

6.5 Measures and means intended for rescue of people as well as exits not conforming to 6.9 are not taken into account in arrangement and design of the evacuation process from all spaces and buildings.

6.6 It is not allowed to locate spaces of class Φ5 of categories A and B under the spaces intended for simultaneous staying of over 50 persons, as well as in basement and lower storeys.

It is not allowed to locate spaces of classes Φ1.1, Φ1.2 and Φ1.3 in basement and lower storeys.

6.7 Smoke protection of buildings shall be performed in conformance with SNiP 2.04.05. The air supply for smoke protection in fire envisaged by this code shall be provided automatically.

The fire warning system shall be made in conformance with NPB 104.

FIRE ESCAPES AND EMERGENCY EXITS

6.9 Exits are considered as fire escapes, if they lead:

- a) from spaces on the first floor to outside:
 - directly;
 - through a corridor;
 - through a vestibule (lobby);
 - through a staircase;
 - through a corridor and vestibule (lobby);
 - through a corridor and staircase;
- b) from spaces on any floor, except the first one:
 - directly into a staircase or a stair of the 3d type;
 - into a corridor leading directly to a stair of the 3d type;
 - into a hallway (lobby) having an exit directly to a staircase or a stair of the 3d type;
- c) into a neighboring space (except a space of class $\Phi 5$ of category A or Б) on the same floor, provide with exits mentioned in *a* and *b*; exit into a space of category A or Б is allowed to be considered as fire escape, if it leads from a utility space without permanent working places, meant for servicing of the above space of category A or Б.

Exits from basement and lower storeys considered as fire escapes, shall be provided, as a rule, directly outside and isolated from common staircases of the building.

It is allowed:

to provide fire escapes from basements through common staircases with an isolated exit outside to be separated from the other part of the staircase with a blind fire partition of the 1 st type;

fire escapes from basement and lower with spaces of categories Б, Г and Д to be provided into spaces of categories Г, Д and into a lobby located on the first floor of buildings of class $\Phi 5$ while observing the requirements of 7.23;

fire escapes from lobbies, cloak-rooms, smoking rooms and rest-rooms located in basement or lower storeys of buildings of classes $\Phi 2, \Phi 3$ and $\Phi 4$ to be provided into a lobby of the first floor along individual stairs of the 2nd type;

to provide a vestibule-lock in the exit directly outside of the building, from basement and lower storeys.

6.10 Exits are not considered as fire escapes, if their openings have sliding and overhead doors and gates, gates for railway rolling stock, revolving doors and turnstiles.

Wicket doors in hinged gates can be considered as fire escapes.

6.11 The number and the total width of fire escapes from spaces, floors and buildings are determined with regard to the maximally possible number of those to be evacuated through them and the ultimate allowable distance from the remotest place of occupants' possible staying (working place) to the nearest fire escape.

Parts of a building with different functional fire hazard divided with fire separations, shall be provided with individual fire escapes.

6.12 At least two fire escapes shall be provided in:

Spaces of class $\Phi 1.1$ intended for simultaneous staying of more than 10 persons;

Spaces of basement and lower stories intended for simultaneous staying of more than 15 persons; in spaces of basement and lower stories intended for simultaneous staying of 6 to 15 persons, one of two exits is allowed to be provided in conformance with the requirements of 6.20, г;

Spaces intended for simultaneous staying of over 50 persons;

Spaces of class $\Phi 5$ of categories A and Б with the number of employees in the most numerous shift of over 5 persons, of category Б – over 25 persons or over 1000m² in area;

Open intermediate floors and landings in spaces of class $\Phi 5$ intended for equipment servicing, with the tier floor area over 100m^2 – for spaces of other categories.

Spaces of class $\Phi 1.3$ (apartments) located on two floors (levels), with the upper floor location over 15 m shall have fire escapes from each floor.

6.13 At least two fire escapes shall be on the floors in buildings of class:

$\Phi 1.1$; $\Phi 3.3$; $\Phi 4.1$; $\Phi 4.2$;

$\Phi 1.2$; $\Phi 3$; $\Phi 4.3$ with the floor location height over 9 m and the number of people on the floor over 20;

$\Phi 1.3$ with the total area of apartments on the floor, while for bay-type buildings – on the bay floor – over 500m^2 ; with a less area each apartment located at over 15 m height shall have an emergency exit (6.20) in addition to a fire escape.

$\Phi 5$ of categories A and B with the number of employees in the most numerous shift over 5 persons, of category B – 25 persons.

At least two fire escapes shall be in basement and lower floors with an area of over 300m^2 or intended for simultaneous staying of over 15 persons.

6.14 The number of fire escapes from a floor shall be at least two, if there is a space that shall have at least two fire escapes.

The number of fire escapes from a building shall be not less than that of fire escapes from any floor of the building.

6.15 With two and more available fire escapes they shall be dispersed.

When making two fire escapes. Each of them shall ensure safe evacuation of all people occupying a space, floor or building. With more than two fire escapes safe evacuation of all people staying in a space, on a floor or in a building shall be ensured by all fire escapes except each one of them.

6.16 The clear height of fire escapes shall be at least 1.9 m, width – at least:

1.2m – from spaces of class $\Phi 1.1$ with the number of those to be evacuated over 15 persons, from spaces and buildings of other functional fire hazard classes, except class $\Phi 1.3$ -over 50 persons;

0.8 m – in all the rest cases.

The width of external doors of staircases and doors from staircases into lobbies shall be not less than the design one or the stair flight width established in 6.29.

In all cases the fire escape width shall be such that with account of the geometry of the means of egress through an opening or a door a stretcher with a lying person can be carried unhinderedly.

6.17 Doors of fire escapes and other doors in the means of egress shall open in the direction of an exit from a building.

Directions of door opening are not specified for:

- a) spaces of classes $\Phi 1.3$ and $\Phi 1.4$;
- b) spaces with simultaneous staying of not more than 15 people, except spaces of categories A and B;
- c) storage rooms of not more than 200m^2 in area without permanent working places;
- d) W.C.;
- e) Exits to landings of the stairs of the 3d type;
- f) External doors of buildings located in the northern building climatic zone.

6.18 Doors of fire escapes from floor corridors, hallways, foyers, lobbies and staircases shall not have latches preventing their free opening without keys.

Doors of staircases leading to common corridors, doors of elevator hallways and doors of vestibule-lock with constant air excess pressure shall have devices for self-closing and bead sealing, while doors of vestibule-locks with excess air pressure in fire and doors of spaces with

forced smoke protection shall have automatic devices for their closing in fire. In buildings over 15 m high these doors shall have a fire-resistance rating at least F15.

6.19 Exits not meeting the requirements to fire escapes can be considered as emergency ones and be provided for increasing safety of people in fire. Emergency exits are not taken into account during evacuation in fire.

6.20 To emergency exits one also refers:

a) exit to an open balcony or loggia with a blind pier at least 1.2 m from the balcony (loggia) end to the window opening (glazed door) or at least 1.6 m between glazed openings facing the balcony (loggia);

b) exit to an open passage at least 0.6 m wide leading to an adjacent bay of the building of class Φ 1.3 or to an adjacent fire compartment through an air zone;

c) exit to a balcony or loggia equipped with an external ladder that connects balconies or loggias on the floors;

d) exit directly outside from spaces with the finished floor level not lower than -4.5 m and not higher than + 5.0 m through a window or a door not less than 0.75x1.5 m in size, as well as through a hatch not less than 0.6x0.8 m in size; the exit through an areaway shall be equipped with a ladder in the areaway, while the exit through the hatch – with a ladder in the space; the gradient of these stairs is not specified;

e) exit to the roof of building of I and II fire-resistance degrees and classes C0 and C1 through a window, door or hatch with the size and the stair according to d).

6.21 It is allowed to provide emergency exits from utility storeys intended only for laying service lines, through the doors at least 0.75x1.5 m in size, as well as through hatches at least 0.6x0.8 m in size without arrangement of fire escapes.

With the utility storey area up 300 m² it is allowed to provide one exit, while for each subsequent and short 2000 m² of area one should provide at least one more exit.

In crawl spaces these exits shall be isolated from exits out of the building and shall lead directly outside.

MEANS OF EGRESS

6.22 Means of egress shall be lighted in conformance with the requirements of SNiP 23-05.

6.23 The ultimately permissible distance from the remotest point of a space, while for buildings of class Φ 5- from the remotest working place to the nearest fire escape measured along the axis of the means of egress, shall be limited depending on the class of functional fire hazard and the explosion-fire hazard category of the space and the building, the number of those to be evacuated, geometrical parameters of spaces and means of egress, the class of structural fire hazard and the fire-resistance degree of the building.

6.24 Means of egress should be proved with account of 6.9; they shall not comprise elevators and escalators as well as areas leading:

Through corridors with exits from elevator shafts, through elevator hallways and vestibule-locks in front of elevators, if enclosing components of elevator shafts including elevator shaft doors do not meet the requirements to fire separations;

Through “communicating” staircases, when the staircase landing is a part of the corridor;

Over roofs of buildings, except roofings used for some purposes, or a specially equipped roofing area;

Along stairs of the 2nd type connecting more than two floors (tiers) as well as those leading from basements and lower stories, except the case mentioned in 6.9.

6.25 In buildings of all fire-resistance degrees and classes of structural fire hazard, except buildings of IV fire-resistance degree and buildings of class C3, in the means of egress it is not allowed to use materials with a higher fire hazard than:

Г1, В1, Д1, Т1 –for wall and ceiling finishes and suspended ceiling claddings in lobbies, staircases, elevator hallways;

Г2, В2, Д3, Т3 or Г2, В2, Д2, Т2 – for wall and ceiling finishes and suspended ceiling claddings in common corridors, hallways and foyers;

Г2.П12, Д2, Т2 – for floor coverings in lobbies, staircases, elevator shafts;

Г3,П12, Д3, Т2 – for floor coverings in common corridors, hallways and foyers.

In spaces of class Ф5 and categories А, В and В1 where flammable liquids are produced, used or stored, the floors should be made from non-combustible materials or materials of combustibility group Г1.

Frames of suspended ceilings in spaces and in means of egress should be made from non-combustible materials.

6.26 In common corridors, except the cases particularly specified in codes, it is not allowed to place equipment projecting from the wall plane at height less than 2 m, gas lines and piping with combustible liquids as well as built-in closets except cabinets for utility services and fire cocks.

Common corridors over 60m long should be divided by fire partitions of the 2nd type into portions, the length of which is determined according to SNiP 2.04.05, but should not exceed 60m. Doors in these partitions shall conform to the requirements of 6.18.

6.27 The clear height of horizontal portions of means shall be at least 2m, the width of the horizontal portions of means of egress and ramps shall be at least:

1.2m – for common corridors that can be used for evacuation from class Ф1 spaces of more than 15 persons, from spaces of other functional fire hazard classes – over 50 persons;

0.7m – for passage to single working places;

1.0m – in all other cases.

Anyway the means of egress shall have such a width that with account of their geometry a stretcher with a lying person can be carried through them unhinderedly.

6.28 On floor in the means of egress the height differences less than 45 cm and projections are not allowed, except thresholds in door openings. In places of height differences one should provide stairs with the number of steps of least three or ramps with the gradient of not more than 1:6.

With the stair height over 45 cm one should provide guards with handrails.

In the means of egress it is not allowed to make spiral stairs and windersteps as well as stairs with variable tread widths and step heights within a flight and a staircase.

EVACUATION BY STAIRS AND STAIRCASES

6.29 The width of a stair flight meant for evacuation of occupants including that located in the staircase, shall be not less the design one or not less than the width of any fire escape (door) opening to it, but, as a rule, be at least:

a) 1.35 m – for buildings of class Ф1.1;

b) 1.2 m – for buildings with the number of occupants on any floor, except the first one, over 200 persons;

c) 0.7 m – for stairs leading to single working places;

d) 0.9 m –for all other cases.

6.30 The stair gradient in the means of egress shall be, as a rule, not more than 1:1; the tread width – as a rule, at least 25 cm, the step height – not more than 22 cm.

The gradient of open stairs for passage to single working places is allowed to be increased up to 2:1.

It is allowed to decrease the tread width of curvilinear main stairs in the narrow part down to 22 cm; the tread width of stairs leading only to spaces (except spaces of class $\Phi 5$ and categories A and B) with the total number of working places of not more than 15 persons – down to 12 cm.

Stairs of the 3d type should be made from non-combustible materials and be located, as a rule, at blind (without light openings) parts of walls of the class not lower than K1 with a fire-resistance rating not lower than REI 30. These stairs shall have landings on the level of fire escapes, guardrails 1.2 m high and be located at the distance of at least 1 m from window openings.

6.31 The landing width shall be not less than the flight width; in front of elevator entrances with swing doors – not less than a sum of the flight width and the half of the elevator door, but at least 1.6 m.

Intermediate landings in the straight flight shall have a width of at least 1 m.

Doors leading to a staircase, in the open position, shall not decrease the width of landings and flights.

6.32 In staircases it is not allowed to lay gas lines and piping with combustible liquids, to locate built-in closets, except cabinets for utility lines and fire cocks, electric cables and wires (except the wiring for lighting of corridors and staircase), to build-in spaces of any purposes, to provide exits from freight elevators and hoists, as well as to install equipment projecting from wall planes at height of up to 2.2 m from the surface of stair treads and landings.

In buildings up to 28 m high inclusive, in ordinary staircases, it is allowed to provide refuse chutes and wiring for space lighting.

6.33 In staircases, except pressurized ones, it is allowed to arrange not more than two passenger elevators descending not lower than the first floor, with enclosing components of elevator shafts from non-combustible materials.

In pressurized staircases it is allowed to provide only heating appliances.

6.34 Staircases shall have exits directly outside to the adjoining territory. With an exit from the staircase into a lobby, the latter shall be separated from corridors and adjacent spaces by fire partitions of the 1st type.

Staircases of H1 type shall have exits directly outside only.

6.35 Staircases, except those of JI2 type, shall have as a rule, light openings of at least 1.2 m² in area in external walls on each floor.

It is allowed to provide not more than 50% of internal staircases intended for evacuation without light openings in buildings:

Of classes $\Phi 2$, $\Phi 3$ and $\Phi 4$ – H2 type or H3 type with excess air pressure in fire;

Of class $\Phi 5$ and category B up to 28 m high, those of categories Γ and Δ irrespective of the building height – of H3 type with excess air pressure in fire.

Staircases of JI2 type shall have in the roof the light openings of at least 4m² in area with a clearance between the flights of at least 0.7m wide or a light shaft to the total height of the staircase with the horizontal section area of at least 2m².

6.36 Smoke protection of staircases of H2 and H3 types shall be provided in compliance with SNiP 2.04.05. When necessary, staircases of H2 type should be divided into compartments by height with blind fire partitions of the 1st type with a passage between compartments beyond the staircase space.

Windows in staircases of H2 type shall be of a non-openable type.

6.37 Pressurization of passages through an external air zone leading to pressurized staircases of H1 type shall be provided by their structural and spatial-planning solutions: these passages shall be open, shall not be located in internal corners of the building and shall be at least 1.2 m wide with the guardrail 1.2 m high; the width of a pier between two door openings in

the external air zone shall be at least 1.2 m, and between door openings of the staircase and the nearest window – at least 2 m.

6.38 Staircases of JI1 type can be provided in buildings of all classes of functional fire hazard up to 28 m high; in buildings of class Ф5 and categories A and Б the exits into a floor corridor from spaces of categories A and Б shall be provided through vestibule-locks with a constant excess air pressure.

6.39 Staircases of JI2 type are allowed to be provided in buildings of I and II fire-resistance degrees and structural fire hazard classes C0 and C1 and functional fire hazard classes Ф1, Ф2, Ф3 and Ф4 not more than 9m high, as a rule. It is allowed to increase the height of buildings up to 12 m, if an automatically openable upper light opening is provided in fire.

At the same time:

In buildings of classes Ф1, Ф2, Ф3 and Ф4 such staircases shall be not more than 50%.the other shall have light openings in external walls on each floor;

In buildings of class Ф1.3 of the bay type one should provide in each apartment located higher than 4 m, an emergency exit conforming to 6.20.

6.40 In buildings over 28 m high as well as in buildings of class Ф5 and categories A and Б one should provide pressurized staircases, as a rule, of type H1.

It is allowed:

In corridor-type buildings of class Ф1.3 to provide not more than 50% of staircases of H2 type;

In buildings of class Ф5 and categories A and Б to provide staircases of H2 and H3 types with natural lighting and constant excess air pressure;

In buildings of class Ф5 and category Б to provide staircases of H2 and H3 types with an excess air pressure in fire;

In buildings of class Ф5 and categories Г and Д to provide staircases of H2 or H3 types with an excess air pressure as well as staircases of JI1 type with their division by a blind fire partition every 20 m by height and with a passage from one part of the staircase into another beyond the staircase space.

6.41 In buildings with pressurized staircases one should provide smoke protection of common corridors, lobbies, hallways and foyers.

6.42 In buildings of all classes of functional fire hazard, except Ф1.3, it is allowed proceeding from the technology conditions to provide individual stairs for communication between a basement or lower storey and the first storey, conforming to the requirements in 7.23. These stairs are not taken into account during evacuation, except the case specified in 6.9.

6.43 In buildings of I and II fire-resistance degrees and class C0 it is allowed to provide stairs of the 2nd type from the lobby to the second floor with account of the requirements of the requirements of 7.24.

6.44 In buildings not more than 28 m high of functional fire hazard classes Ф1.2, Ф2, Ф3 and Ф4 of I and II fire-resistance degrees and structural fire hazard class C0 it is allowed to use stairs of the 2nd type, connecting more than two storeys, with available evacuation staircases required by codes, and under observance of the requirements in 7.25.

6.45 Escalators should be provided in conformance with the requirements established for stairs of the 2nd type.

7 FIRE SPREAD PREVENTION

7.1 Fire spread prevention is achieved by the arrangements limiting the burning area, intensity and duration. To them one refers:

Structural and spatial-planning solutions preventing spread of fire hazardous factors over the space, between spaces, between groups of spaces having different functional fire hazards, between storeys and bays, between fire compartments as well as between buildings;

Limitation of fire hazard of building materials used in surface layers of the building's components including roofs, finishes and façade linings, spaces and means of egress;

Reduction of technological explosion-fire and fire hazard of spaces and buildings;

Availability of primary fire-extinguishing means, including automatic and transported ones;

Fire alarm and warning systems.

7.2 Parts of buildings where fire-fighting is difficult (utility spaces and storeys, basement and lower storeys and other parts of buildings), should be equipped with additional facilities aimed as restriction of burning area, intensity and duration.

7.3 Efficiency of measures aimed at prevention of fire spread is allowed to be assessed by technical-economic calculations based on the requirements of section 4 on limitation of the direct and indirect damage from fire.

7.4 Parts of buildings and spaces of different classes of functional fire hazard shall be divided between themselves with enclosing components with specified fire-resistance ratings and classes of structural fire hazard or with fire separations. The requirements to these enclosing components and types of fire separations are established with account of the functional fire hazard of spaces, the fire load value, the fire-resistance degree and class of structural fire hazard of the building.

7.5 When in the building there are parts of different functional fire hazard, divide by fire separations, each of these parts shall meet the fire-prevention requirements to buildings of the appropriate functional fire hazard.

When selecting a fire protection system of the building, one should take into account that with different functional fire hazards of its parts the functional fire hazard of the building as a whole can be higher than that of any of these parts.

7.6 In buildings of class $\Phi 5$ spaces of categories A and Б should be located, if it is allowed by the process requirements, at external walls, while in multi-storey buildings – on upper floors.

7.7 In basement and lower storeys it is not allowed to locate spaces where combustible gases and liquids as well as flammable materials are used or stored, except the particularly specified cases.

7.8 Building components shall not facilitate concealed spread of fire.

7.9 Fire-resistance of fixing joints of building components shall be not less than the required fire-resistance of the component itself.

7.10 Components forming a floor gradient in halls shall meet the requirements established in Tables 4 and 5 for inter-storey floors.

7.11 Points of crossing by cables and piping of the enclosing components with rated fire-resistance and fire hazard shall not reduce the required fire-engineering indices of components.

7.12 Special fire-protection coatings and impregnations applied on an open surface of components shall meet the requirements to components' finishes.

The technical documentation for these coatings and impregnations shall indicate their replacement or renovation intervals with regard to operation conditions.

It is not allowed to use special fire-proof coatings and impregnations in places preventing a possibility of their periodic replacement or renovation.

7.13 Efficiency of fire-protection means used for reduction of fire hazard of materials shall be assessed by tests for determining fire hazard groups of building materials established in section 5.

Efficiency of fire-protection means used for increase of components' fire-resistance shall be assessed by tests for determining fire-resistance ratings of structural components established in section 5.

Efficiency of fire-protection means not taken into account when determining bearing capacities of metal components, is allowed to be assessed without a static load by means of comparable tests of column models of reduced sizes of at least 1.7 m high or beam models with a span of at least 2.8 m.

7.14 Suspended ceilings used for increase of fire-resistance ratings of floors and roofs, by their fire hazard shall meet the requirements to these floors and roofs.

Fire partitions in spaces with suspended ceilings shall divide the space above them.

In the space behind the suspended ceilings it is not allowed to provide arrangement of ducts and piping for transporting combustible gases, air-dust mixtures, liquids and materials.

Suspended ceilings are not allowed to be provided in spaces of categories A and B.

7.15 In points of connection of fire separations with enclosing components of a building, including the points of the building's configuration changes, one should provide measures ensuring non-spread of fire, by-passing these separations.

7.16 Fire walls dividing the building into fire compartments shall be erected to the total height of the building and ensure non-spread of fire into an adjacent fire compartment in case of collapse of the building's components from the fire hotbed side.

7.17 In fire the openings in fire separations shall be closed, as a rule.

Windows in fire separations shall be non-openable, while doors, gates, hatches and valves shall have devices for self-closing and sealing in jambs. Doors, gates, hatches and valves that may be used in the open position, shall be equipped with devices ensuring their automatic closing in fire.

7.18 The total area of openings in fire separations, except elevator shaft guards, shall not exceed 25% of their area. Opening fills in fire separations shall meet the requirements of 5.14 and the requirements of the present section.

In fire separations isolating spaces of categories A and B from spaces of other categories, corridors, staircases and elevator hallways, one should provide vestibule-locks with a constant excess air pressure according to SNiP 2.04.05. **Arrangement of common vestibule-locks for two and more spaces of the above categories is not allowed.**

7.19 When it is not possible to arrange vestibule-locks in fire separations isolating spaces of categories A and B from other spaces, or doors, gates, hatches and valves – in fire separations isolating spaces of category B from other spaces, one should provide a complex of measures on prevention of fire spread and penetration of combustible gases, vapors of flammable and combustible liquids, dusts, fibers capable to form explosive concentrations, into adjacent storeys and spaces. Efficiency of these measures shall be substantiated.

In openings of fire separations that cannot be closed with fire doors or gates, for communication between adjacent spaces of categories B, Г and Д it is allowed to provide open vestibule-locks equipped with automatic fire-extinguishing units. Enclosing components of these vestibule-locks shall be fire-proof.

7.20 Filling of openings in fire separations shall be made, as a rule, from non-combustible materials.

It is allowed to make doors, gates, hatches and valves using the materials at least 4 mm thick.

Doors of vestibule-locks, doors, gates, hatches in fire separations from the side of spaces where combustible gases, liquids and materials are not used and stored as well as the processes

associated with combustible dust formation are not available, are allowed to be made from materials of the materials of the combustibility group Г3 at least 40 mm thick and without voids.

7.21 Fire walls and floors of the 1st type are not allowed to be crossed with ducts, shafts and piping for transportation of combustible gases, air-dust mixtures, liquids, substances and materials.

In points of crossing of such fire separations with ducts, shafts and piping for transportation of media differing from the above, one should provide automatic devices preventing spread of combustion products along the ducts, shafts and piping.

7.22 Enclosing components of elevator shafts (except those in 6.33) and spaces of elevator engine rooms (except those located on the roof) as well as ducts, shafts and recesses for utility lines shall meet the requirements to fire separations of the 1st type and floors of the 3d type.

When it is impossible to arrange in the guards of the above elevator shafts the fire walls, one should provide vestibule-locks or hallways with fire partitions of the 1st type and floors of the 3d type or screens shall be made from non-combustible materials, and their fire-resistance rating shall be at least EI 45.

In buildings with pressurized staircases one should provide automatic smoke protection of elevator shafts having no vestibule-locks at their exits with an excess air pressure in fire.

Refuse chute shafts should be made from non-combustible materials.

7.23 Stairs from a basement (or lower) storey where combustible substances and materials are used or stored, leading to spaces of the first storey (acc. to 6.42), shall be guarded with fire partitions of the 1st type with arrangement of a vestibule-lock with an excess air pressure in fire.

In buildings of class Ф5 an exit from the basement (lower) storey with spaces of categories B4, Г and Д is allowed to be provided to the first floor spaces of the same categories without arrangement of vestibule-locks.

In buildings of classes Ф2, Ф3 and Ф4 exits to the first floor from lobbies, cloak-rooms, smoking-rooms and rest-rooms located in the basement (lower) storey, are allowed to be provided without arrangement of vestibule-locks.

7.24 When arranging stairs of the 2nd type leading from a lobby to the second floor, the lobby shall be separated from corridors and adjacent spaces with fire partitions of the 1st type.

7.25 A space where a stair of the 2nd type is located and provided in 6.44, shall be separated from adjoining corridors and other spaces with fire partitions of the 1st type. It is allowed not to separate with fire partitions the space where the stair of the 2nd type is located:

When arranging automatic fire-extinguishing in all the building;

In buildings at least 9 m high with the floor area not more than 300 m².

7.26 In the basement or lower storey in front of elevators one should provide vestibule-locks of the 1st type with an excess air pressure in fire.

7.27 Selection of sizes of the building and fire compartments as well as distances between the buildings should be performed with regard to their fire-resistance degree, structural and functional fire hazard classes and the fire load value as with account of efficiency of the fire protection means used, availability and remoteness of fire services, their equipment, possible economic and environmental consequences of the fire.

7.28 In the course of operation the serviceability of all engineering facilities of fire protection shall be ensured.

7.29 Automatic fire-extinguishing and fire alarm should be provided in conformance with NPB 110.

8. FIRE FIGHTING AND RESCUE OPERATIONS

8.1 Fighting a possible fire and conduction of rescue operations are provided by structural, spatial-planning, engineering-technical and organizational measures.

To them one refers:

Arrangement of driveways and access roads for fire-fighting vehicles, combined with functional driveways and access roads or those special;

Arrangement of external fire escape ladders and provision of other methods of lifting fire brigades and equipment to buildings' floors and roofs including arrangement of elevators operating in the mode of "fire brigade transportation";

Arrangement of a fire water line including that combined with a potable water line or a special one, and if necessary, arrangement of dry pipes and fire water vessels (tanks);

Smoke protection of fire brigade routes inside the building;

Equipping the building, when necessary, with personal and collective human rescue facilities;

Disposition on the territory of a settlement or a project of fire brigades with the required strength of personal and equipped with fire-resistance aids conforming to fire-fighting conditions at projects located in their range of operation.

Selection of these measures depend on the fire-resistance degree, the class of structural and functional fire hazard of the building.

8.2 Driveways for basic and special fire engines should be provided in conformance with the requirements of SNiP 2.07. 01, SniP II-89, SNiP II-97.

8.3 For buildings 10 m and more high to the eaves or the external wall top (parapet) one should provide exits to the roof directly from staircases or through an attic, including a heated attic, as well as by stairs of the 3d type or by external fire escape ladders.

The number of exits to the roof and their location should be provided with regard to the functional fire hazard and the building's dimensions, but at least one exit:

For each complete and short 100 m of the length of a building with an attic roof and at least one exit each complete and short 1000 m² of the roof area for buildings without attics of classes $\Phi 1$, $\Phi 2$, $\Phi 3$ and $\Phi 4$;

Along fire escape ladders every 200 m by perimeter of buildings of class $\Phi 5$.

It is allowed not to provide:

Fire escape ladders on the building's main façade, if the building's width does not exceed 150 m while from the side opposite to the main façade there is a fire water line;

Exit to the roof of one-storey buildings with a roof area not more than 100 m².

8.4 In buildings' attics one should provide exits to the roof equipped with fixed ladders, through doors, hatches or windows at least 0.6x0.8m in size.

Exits from staircases to the roof or attic should be provided by stair flights with landings in front of exits, through fire doors of the 2nd type at least 0.75x1.5 m in size.

In buildings of $\Phi 1$, $\Phi 2$, $\Phi 3$ and $\Phi 4$ up to 15 m high it is allowed to arrange exits to the attic or roof from staircases through fire hatches of the 2nd type 0.6x0.8 m in size over fixed steel step ladders.

8.5 In utility storeys including crawl spaces and utility attics the clear height of passages shall be at least 1.8 m; in attics along all the building – at least 1.6m. The width of these passages shall be at least 1.2 m. In some portions not more than 2 m long it is allowed to reduce the passage height down to 1.2 m, while the width – down to 0.9m.

8.6 In buildings with mansards one should provide hatches in enclosing components of attic pocket recesses.

8.7 In points of roof height differences (including those for lifting aeration skylights to the roof) over 1 m one should provide, as a rule, fire escape ladders.

Fire escape ladders are not provided at roof height differences over 10 m, if each portion of the roof over 100 m² in area has its own exit to the roof, meeting the requirements in 8.3, or if the height of the roof, meeting the requirements in 8.3, or if the height of the roof lower portion determined according to 8.3 does not exceed 10 m.

8.8 For ascending the height from 10 to 20 m and in points of roof height difference from 1 to 20 m one should use fire escape ladders of III type, for ascending the height over 20 m and in points of height difference over 20 m – fire escape ladders of II 2type.

Fire escape ladders shall be made from non-combustible materials, located not closer than 1 m to windows and be designed for their use by fire brigades.

8.9 Between stair flights and between hand railings of stair flights one should provide a clear gap at least 75 mm wide in plan.

8.10 In each fire compartment in buildings of class Ф1.1 over 5 m high, in buildings of all classes of functional fire hazard over 28 m high one should provide elevators operated in the mode of “fire brigade transportation” and located in shafts with enclosing components meeting the requirements to fire separations with a fire-resistance rating REI 120 with fire-proof doors having a fire-resistance rating EI 60.

8.11 In buildings with the roof pitch up to 12% inclusive, the height to the eaves or the external wall top (parapet) over 10 m as well as in buildings with the roof pitch over 12 % and the height to the eaves over 7 m one should provide guards on the roof in conformance with GOST 25772. Irrespective of the building’s height the guards meeting the requirements of this standard should be provided for flat roofings used for some practical purposes, balconies, loggias, external galleries, open external stairs, stair flights and landings.

8.12 Fire stations should be located on the territory in compliance with the requirements of SNiP 2.07.01, SNiP II-89 and NPB 101.

8.13 The necessity of arranging a fire water line and other stationary fire-extinguishing facilities shall be provided with regard to the fire-resistance degree, the structural and functional fire hazards of the building, the value and fire-explosion hazard of the temporary fire load.

8.14 Fire water supply systems of buildings shall be provided with a permanent access for fire brigades and their equipment.

UDC [69=699.81] (063.74)

Key words: building materials, components, spaces, buildings and structures, fire resistance, fire hazard, fire, human safety assurance, evacuation, fire spread prevention, fire extinguishing, rescue operations
