On approval of the building regulations of the Republic of Kazakhstan

Invalidated Unofficial translation

Order No. 9-NK of the Chairman of the Committee for Construction, Housing and Utilities of the Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan dated January 20, 2020. Registered with the Ministry of Justice of the Republic of Kazakhstan on January 22, 2020 under No. 19907. Abolished by Order of the Acting Chairman of the Committee for Construction and Housing and Communal Services of the Ministry of Industry and Construction of the Republic of Kazakhstan dated October 18, 2023 No. 153-NK

Footnote. Abolished by Order of the Acting Chairman of the Committee for Construction and Housing and Communal Services of the Ministry of Industry and Construction of the Republic of Kazakhstan dated October 18, 2023 No. 153-NK (effective ten calendar days after the date of its first official publication).

In conformity with sub-paragraph 23-16) of Article 20 of the Law of the Republic of Kazakhstan dated July 16, 2001 “On Architectural, Urban Planning and Construction Activities in the Republic of Kazakhstan” and sub-paragraph 489) of function of departments of paragraph 16 of the Regulation on the Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan” approved by Decree No. 936 of the Government of the Republic of Kazakhstan of December 29, 2018, **I HEREBY ORDER**:

1. That the following building regulations shall be approved:

1) building regulations of the Republic of Kazakhstan 3.02-27-2019 “Production Buildings” in compliance with annex 1 to this order;

2) building regulations of the Republic of Kazakhstan 3.02-29-2019 "Warehouse Buildings" pursuant to annex 2 to this order;

3) building regulations of the Republic of Kazakhstan 3.02-09-2019 "Mixed-Use Buildings and Constructions" according to annex 3 to this order;

4) building regulations of the Republic of Kazakhstan 5.03-02-2019 "Production of Prefabricated Reinforced Concrete Structures and Products" pursuant to Annex 4 to this order.

2. That the Directorate of Technical Regulation and Standardization of the Committee on Construction and Housing and Utilities of the Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan shall ensure:

1) state registration of this order with the Ministry of Justice of the Republic of Kazakhstan;

2) posting this order on the website of the Committee for Construction, Housing and Utilities of the Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan.

3. That the supervising deputy chairman of the Committee for Construction and Housing and Utilities of the Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan shall be in charge of the execution of this order.

4. That this order shall take effect ten calendar days after the date of its first official publication.

Chairman of the Committee for
Construction, Housing and Utilities *M. Zhayimbetov*

"AGREED BY"
Ministry of Healthcare
of the Republic of Kazakhstan

"AGREED BY"
Ministry of Labour and Social Protection
of the Population
of the Republic of Kazakhstan

"AGREED BY"
Ministry of Internal Affairs
of the Republic of Kazakhstan

"AGREED BY"
Ministry of Ecology,
Geology and Natural Resources
of the Republic of Kazakhstan

"AGREED BY"
Ministry of Energy
of the Republic of Kazakhstan

Annex 1 to Order of the
Chairman of the Committee for
Construction and Housing and Utilities
of the Ministry of Industry and
Infrastructure Development
of the Republic of Kazakhstan
No. 9-NK dated January 20, 2020

BR RK 3.02-27-2019 BUILDING REGULATIONS OF THE REPUBLIC OF KAZAKHSTAN PRODUCTION BUILDINGS

CONTENT

Chapter 1. Scope of application

1. These building regulations establish requirements for the design, construction, reconstruction and operation of production buildings.

2. The requirements of these building regulations shall apply to buildings, industrial premises of all industries, except for buildings and structures for the production of explosives and blasting agents and underground mine workings.

3. The requirements of these building regulations shall be observed at any stages of the design and construction of production buildings.

Chapter 2. References to regulatory acts

The following references to the regulatory acts of the Republic of Kazakhstan are necessary for the application of these building regulations:

1) Code of the Republic of Kazakhstan of January 9, 2007 "Environmental Code of the Republic of Kazakhstan" (hereinafter referred to as the Environmental Code);

2) Code of the Republic of Kazakhstan of September 18, 2009 on Public Health and the Health Care System (hereinafter referred to as the Code);

3) Law of the Republic of Kazakhstan of July 16, 2001 on Architectural, Urban Planning and Construction Activities in the Republic of Kazakhstan (hereinafter, the Law);

4) Order No. 230 of the Minister of Energy of the Republic of Kazakhstan dated March 20, 2015 "On Approval of the Rules for Electrical Installations" (registered with the Register of State Registration of Regulatory Legal Acts under No. 10851) (hereinafter - REI);

5) Order No. 1111 of the Minister of Internal Affairs of the Republic of Kazakhstan dated November 29, 2016 "On Approval of the Technical Regulations “Requirements for equipping buildings, premises and structures with automatic fire extinguishing systems and automatic fire alarms, warning and evacuation control in case of fire” (registered with the Register of State Registration of Legal Acts under No. 14858);

6) Order No. 439 of the Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 "On Approval of the Technical Regulations “General Requirements for Fire Safety” (registered with the Register of State Registration of Regulatory Legal Acts under No. 15501);

7) Decree of the Government of the Republic of Kazakhstan No. 1017 of September 25, 2014 “On Approval of the List of Organizations and Facilities Where a Non-Governmental Fire-Fighting Service Is Mandatorily Established";

8) BR RK 2.02-01-2014 "Fire Safety of Buildings and Structures".

Note* - When applying, it shall be advisable to verify the validity of reference documents using the information catalogues “List of Regulatory Legal Acts and Regulatory Technical Documents in the Field of Architecture, Town Planning and Construction, Valid on the Territory of the Republic of Kazakhstan”, compiled annually as of the current year and relevant monthly newsletters - journals and information indices of standards, published in the current year.

Chapter 3. Terms and definitions

4. The following terms with their respective definitions shall be used in these building regulations:

1) amenity buildings - buildings of enterprises designed to accommodate social service facilities for employees.

2) site - a single-storey structure (without walls) placed inside or outside a building, supported by independent supports, building or equipment structures and designed for the installation, maintenance or repair of equipment;

3) engineering equipment of the building - the system of appliances, devices, machines and communications ensuring the supply and withdrawal of liquids, gases, electricity (water, gas, heating, electric, sewage, ventilation equipment);

4) number of floors of the building – a number of floors of the building, including all the above-ground, technical and ground floors, if the top of the floor is at least 2 m above the average ground plan mark (hereinafter - m);

5) basement floor - a floor where the floor of the premises is more than half the height of the premises below the ground plan level;

6) technical floor - a floor for placement of engineering equipment and laying of communications may be located in the lower (technical cellar), upper (technical attic) or in the middle part of the building;

7) ground floor - a floor where the floor of the premises is not more than half the height of the premises below the ground level.

Chapter 4. Objectives of regulatory requirements and functional requirements of building regulations

Paragraph 1. Objectives of the regulatory requirements of building regulations

5. The objectives of the regulations shall be to ensure the safety of production buildings at any stages of their life cycle in order to protect life, health, property and the environment, to use natural resources rationally, to save energy consumption, and to create conditions for the production process and work with due regard for its technological and specific characteristics.

Paragraph 2. Functional requirements of building regulations

6. The structures of production buildings shall be designed to withstand a combination of loads and other stresses to which they are subjected throughout their life cycle before demolition.

7. Production buildings shall be designed to create conditions to prevent or reduce the risk of fire and its hazards and, in the event of fire, to ensure the stability of supporting structures for the duration of the evacuation of persons, including those with reduced mobility, to a fire-safe area and fire suppression.

8. If a fire cannot be quickly extinguished in the building and area, conditions shall be created to limit the spread of the fire and its hazards beyond the point of ignition. The possible fire behaviour of the building or its elements shall limit the spread of fire to neighbouring buildings under the most unfavourable weather conditions.

9. The layout of the production plant area shall be designed so that the arrangement of workshops and production areas meets the requirements of the production process, ensuring its flow, the interconnection of workshops and areas connected by the sequence of the technological process.

10. Conditions shall be created in production buildings to ensure the protection of human life and health during the operation of the building, with allowance for the landscaping, architectural and planning solutions, sanitary and epidemiological requirements.

11. The future development of the technological process used, which makes it possible to change and improve production without reconstructing the building itself, shall be factored into the volume planning and design of the building.

12. The building shall be designed in such a way as to exclude the possibility of injury to persons during movement, work, use of mobile devices, technological and engineering equipment.

13. The internal engineering systems shall provide a favourable microclimate, including temperature, as well as internal wall surface temperatures, humidity and air velocity, as well as the thermal resistance of the building envelope and the heat absorption of the floor surface.

14. Water supply and sewerage systems and their internal networks must prevent leaks and contamination of soil and the environment.

15. Sound and light insulation of rooms, including insolation, must create normal working conditions and prevent health hazards.

16. In production buildings and facilities, the conditions shall be created to enable persons with reduced mobility to stay, to safely carry out necessary activities on their own or with the help of auxiliary equipment, and to evacuate in case of an emergency.

17. The construction of production buildings shall include measures for environmental protection, restoration of the natural environment, rational use and reproduction of natural resources, ensuring environmental safety, and establishment of a preliminary (estimated) sanitary protection zone.

18. The design of production buildings and adjacent areas shall provide for the disposal of municipal solid waste.

19. Production buildings and their building envelopes, heating and cooling systems, ventilation and air conditioning systems, and lighting shall be operated in an energy-saving and heat conservation mode.

20. In production buildings, the rational use of natural resources shall be ensured while maintaining the performance of building structures, materials and products pursuant to the design life of the building, maximising the use of production waste and secondary materials for the manufacture of building materials and structures, reusing building structures and recycling building scrap for the production of building materials when demolishing.

Chapter 5. Performance requirements for production buildings

Paragraph 1. Substantive provisions

21. The architectural solutions of the buildings shall be made with due regard for the urban and climatic conditions of the area and the nature of the surrounding buildings.

22. Safety of occupants shall be ensured by: absence of harmful substances in the air of working areas above the maximum permissible concentrations, minimum heat and moisture release into the premises; absence of noise, vibration, ultrasound levels, electromagnetic waves, radio frequencies, static electricity and ionising radiation above the permissible values, as well as limiting physical strain, attention span and preventing fatigue of workers.

23. The space planning and design of the production buildings shall ensure safety by complying with the relevant technical regulations.

24. When designing production buildings, it shall be necessary to:

1) make the space-planning solutions of buildings bearing in mind the reduction of the area of external enclosing structures;

2) take the area of light openings in conformity with the design standards for natural and artificial lighting;

3) design space planning solutions against the background of the need to reduce the dynamic effects on building structures, processes and workers caused by vibration-active equipment or external vibration sources.

Paragraph 2: Requirements for the reliability and stability of buildings

25. The structural design of the building shall be taken with the allowance for the requirements of the industry (degree of aggressiveness of the internal environment, fire resistance, etc.) and the area of construction (climatic conditions, loads, availability of appropriate materials and structures, etc.).

26. In the case of large space buildings, temperature-shrinkage, sedimentary or anti-seismic joints shall be provided, depending on the structural design and the climatic conditions of the building area.

27. The construction shall be designed in such a way that the load-bearing capacity of the constructions is not affected by changes over time during the design life of the construction. Whereby, environmental influences and planned maintenance measures must be factored in.

28. Potential damage must be limited or eliminated by implementing one or a combination of measures aimed at:

1) preventing, eliminating or reducing the hazards to which the building is exposed;

2) selection of structural forms that are insensitive to the potential hazards;

3) the use of structural forms and design solutions in which the failure or accidental removal of a single element or part of a structure would not lead to the complete failure of the whole structure;

4) the exclusion, if possible, of load-bearing structural systems that fail without prior evidence;

5) reliable connection of structural elements.

29. Compliance with the fundamental requirements shall be ensured by means of:

1) the use of suitable building materials, products and structures;

2) good design and calculation as well as appropriate construction execution;

3) the assignment of control procedures during the design, manufacture, construction and operation phases relevant to the specific project.

30. During the design phase, environmental conditions must be determined in order to establish their effect on durability and appropriate measures must be envisaged to protect building materials and products.

Paragraph 3: Fire safety requirements

31. The fire safety and space planning of the building must comply with the requirements:

1) Technical Regulations "General Fire Safety Requirements" approved by Order No. 439 of the Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 (recorded in the Register of State Registration of Regulatory Legal Acts under No. 15501);

2) Technical Regulations "Requirements for Equipping Buildings, Premises and Structures with Automatic Fire Extinguishing Systems and Automatic Fire Alarm, Warning and Evacuation Control Systems in Case of Fire" approved by Order No. 1111 of the Minister of Internal Affairs of the Republic of Kazakhstan dated November 29, 2016. (recorded in the Register of State Registration of Regulatory Legal Acts under No. 14858);

3) A list of organisations and facilities where it is compulsory to establish a non-governmental fire brigade;

4) other regulatory documents on fire safety in force in the territory of the Republic of Kazakhstan.

32. The basic space planning of production buildings shall be determined by taking into consideration the organisation of technological processes. In doing so, the buildings must ensure safety and reliability under design operating conditions as well as in extreme situations, one of which is a fire hazard.

33. Space and layout design of the building shall be made with due regard for the functional fire risk of the premises. Where buildings have different functional fire risks , they must be combined in those parts of the building for which fire protection measures are provided that correspond to the fire risks of the building. Where buildings contain compartments with different fire hazard functions, they must be located in those parts of the building for which fire protection measures have been provided.

34. If there are areas or processes with different fire hazards in the same room, measures must be taken to prevent the spread of fire.

35. The location of rooms shall take into account the risk of fire spreading to adjacent rooms through doorways and openings, through building structures and utilities, through exterior openings vertically and horizontally, and through the heating of enclosing structures or utilities or their collapse.

36. The space-planning and design solutions of production buildings shall ensure that in a fire situation:

1) the evacuation of people to the outside to the adjacent territory before the threat to life and health due to fire hazards;

2) the possibility of rescuing people who have not had time to evacuate;

3) fire-fighting units and fire-fighting equipment can access the fire and take measures to save people and property;

4) the non-proliferation of the fire to adjacent fire compartments and to adjacent buildings.

37. When processes with different explosion and fire hazards are located in the same building or room, measures shall be taken to prevent explosion or fire.

38. The means of preventing the spread of fire shall be selected on the basis of a feasibility study which includes constructing fire scenarios, predicting the likely damage and deciding on the best way to minimise the amount of damage and the cost of these means.

39. Classification of construction materials by groups and classes of fire hazard, and buildings by degrees of fire resistance, fire resistance limit and classes of structural fire hazard shall be accepted pursuant to the Technical Regulations “General Fire Safety Requirements” approved by Order No. 439 of the Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 (recorded in the Register of State Registration of Regulatory Legal Acts under No. 15501).

40. Explosion and fire hazard categories of premises shall be established in compliance with the requirements of the Technical Regulations "General Fire Safety Requirements” approved by Order No. 439 of the Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 (recorded in the Register of State Registration of Regulatory Legal Acts under No. 15501). Explosion and fire hazard categories of buildings shall be determined for the most unfavourable period with regard to fire or explosion.

41. Automatic fire extinguishing installations and automatic fire alarms, as well as notification systems shall be provided in conformity with the requirements of the Technical Regulations “Requirements for Equipping Buildings, Premises and Structures with Automatic Fire Extinguishing Systems and Automatic Fire Alarms, Notification and Management of Evacuation in Case of Fire” approved by Order No. 1111 of the Minister of Interior of the Republic of Kazakhstan dated November 29, 2016 (registered with the Registry of State Registration of Legal Entities).

42. Minimising the amount of economic damage and fire protection costs in building design shall be primarily ensured by matching the fire resistance and structural fire hazard class with the functional fire hazard class when selecting space planning and design solutions according to the functional use of the building and the premises with regard to human safety.

43. The area of fire compartments and the number of storeys must be limited depending on the explosion and fire hazard category, the degree of fire resistance, the structural and functional fire hazard classes of the buildings, the possibility of reaching the fire resistance limit of the supporting building structures in a fire, assessed by the fire load and fire resistance limits ratio with regard to the reliability of fire detection and extinguishing equipment.

44. The technical feasibility and economic viability of an acceptable level of fire risk shall be justified with due regard for the purpose and layout of the buildings, the required life span, the degree of responsibility, the fire hazard of the building and the reliability of the fire extinguishing equipment.

45. Evacuation routes shall be designed pursuant to the requirements of technical regulations “General Fire Safety Requirements” approved by Order No. 439 of the Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 (registered with the Registry of State Registration of Regulatory Legal Acts under No. 15501) and regulations in the field of architecture, urban planning and construction on fire safety of buildings and constructions.

46. With a view to ensuring fire safety, escape exits must be provided from each floor of the building, including the basement, the number of which shall be determined by the estimated time of evacuation and the likelihood of blocked exits.

47. If an escape route leads to a corridor, outdoors or to a stairwell through an adjoining room, the distance to the exit shall be based on the most dangerous category of one of the adjoining rooms.

48. When rooms of different categories are located on the same floor, the distance along the corridor from the door of the furthest room to the exit to the outside or to the nearest stairwell shall be determined by the more dangerous category.

The corridor occupancy shall be determined as the ratio of the number of people evacuating from the premises into the corridor to the area of the corridor, with doors opening from the premises into common corridors, the width of the common corridor being assumed to be reduced:

1) by half of the width of the door leaf - for one-sided doors;

2) by the width of the door leaf - for double-sided doors.

49. The width of an evacuation exit (door) from a corridor to the outside or to a stairwell shall be based on the total number of people evacuating through this exit and the number of people per 1 m of exit (door) width.

50. The possibility of movement of persons with reduced mobility must be taken into account, when calculating the width of evacuation staircases.

51. Smoke extraction in case of fire must be provided in rooms and corridors in compliance with the requirements of state regulations on architecture, town planning and construction, approved pursuant to Article 20, sub-paragraph 23-16) of the Law (hereinafter state regulations on architecture, town planning and construction).

52. Openable skylights, taken into account in the calculation of the smoke extraction, shall be evenly distributed over the covering area.

53. Blanking boards or trays made of non-combustible materials shall be provided in overlapping areas and process areas where apparatuses, installations and equipment containing flammable, combustible and toxic liquids are installed. The height of the boards and the area between the boards or pallets shall be specified in the technological part of the project.

Paragraph 4. Requirements for the protection of human health in the operation of buildings

54. The site selection requirements for new, expanded, reconstructed as well as existing production facilities shall be imposed in compliance with the current land and water resources regulations as well as pursuant to the requirements of state regulations in the field of architecture, urban planning and construction.

55. The site for construction of new and expansion of existing facilities shall be selected with consideration of aeroclimatic characteristics, topography, patterns of industrial emissions distribution in the atmosphere, atmospheric pollution potential downwind of the residential, recreational, resort and leisure areas of the population.

56. It shall be prohibited to locate new facilities in recreational areas, resort, sanitary protection, water protection and coastal zones of water bodies.

57. Enterprises shall be located both individually and in groups with varying degrees of cooperation in conformity with the characteristics of production.

58. At facilities using hazardous substances, the administrative and auxiliary areas shall be separated by gaps from the production and transport and storage areas.

59. Access roads shall be provided at the site as well as the possibility to drive around the buildings. The surface of the access roads must be paved.

60. The fencing of business premises shall be designed with due regard for their conditions of operation and protection.

61. Underground parts of fences shall be insulated from water exposure. Mesh and wire used for fencing shall have an anti-corrosion coating.

62. When hazardous substances are used, the long axes of buildings and open areas for process equipment shall be assumed to be parallel to the prevailing wind direction.

63. Employee parking areas shall be separated from truck parking areas.

64. Driveways, car parks on the territory of production facilities shall be designed so as to provide access for trucks to all buildings and structures without the need to leave the site.

65. Spaces for loading bays shall be provided when designing the site of production buildings.

66. Areas free from buildings and roads shall be modernised and landscaped.

67. The design of the buildings shall ensure the functional purpose of the buildings and create the optimum conditions for production.

68. The building structures, supported by appropriate calculations, must be durable and reliable with regard to possible hazardous influences as well as resistant to progressive collapse.

69. The design of production buildings, rooms and facilities shall be such that personnel not engaged in the maintenance of technological processes and equipment shall not be exposed to harmful factors above the rated parameters.

70. The mutual arrangement of the separate rooms within the buildings shall be designed pursuant to the process flow, excluding the return or cross-movement of raw materials, intermediate and finished products and goods, unless this is contrary to the requirements of the organisation of the technological process.

71. When individual workplaces and production areas are combined in one building or facility, measures must be taken to prevent exposure of workers to occupational hazards and their spillover to neighbouring areas where work not related to these production factors is carried out (isolation, air curtains, etc.).

72. The external walls of production buildings and structures must allow for natural air exchange and natural lighting, unless this is incompatible with specific process requirements.

73. The length of the loading and unloading ramp shall be determined according to the turnover and capacity of the warehouse and the space planning of the building. The widths of the loading and unloading ramps and platforms shall be determined in conformity with loading and unloading technology and safety requirements.

74. The design and materials of substrates and flooring of warehouse buildings and premises shall be designed to withstand the loads of the goods stored, the type and intensity of the mechanical effects of floor transport and dust emission, static electricity and spark formation.

75. Single-storey buildings or upper floors of multi-storey buildings with structural elements of walls and roofs that provide natural controlled air exchange (aeration) shall be envisaged for facilities characterised by hot processes without the emission of harmful substances in the form of vapours, gases and dust.

76. When several facilities handling hazardous substances are located in the same building, each facility shall be isolated using construction solutions that prevent the

formation of multi-component mixtures of toxic substances and their spread to neighbouring production facilities.

77. The laying of pipelines for the transport of noxious liquids and gases as well as transit steam pipelines in the control rooms, sanitary facilities and pedestrian tunnels shall be prohibited.

78. The arrangement of the main and auxiliary equipment at the workplace shall ensure sufficient aisles and free space to create and operate a permanent or temporary (for the period of preventive inspection, repair and adjustment of technological equipment) workplace, as well as free movement of workers in the service area.

79. Warehouses for raw materials, semi-finished and finished products located in production buildings as well as loading platforms (ramps) must be designed in compliance with sanitary and epidemiological requirements and national regulations on architecture, town planning and construction.

80. Freight lifts shall be permitted in production buildings.

81. It shall be permitted to construct buildings without windows and skylights, placement of production premises with permanent workplaces in basements and ground floors with insufficient natural lighting. The following shall be provided for:

1) artificial lighting;

2) a device for ultraviolet irradiation;

3) arrangement of rooms for short-term relaxation of workers;

4) provision of permanent forced ventilation in accordance with the requirements of the applicable hygienic standards.

82. All employees shall be provided with recreational facilities during working hours. It shall be prohibited to store or eat food in the production area.

83. Basement exits must be provided outside the operating area of lifting and handling equipment.

84. Extensions to the outer walls of industrial buildings shall be permitted provided that this does not interfere with the natural air exchange and lighting.

85. Premises in categories A and B of explosion and fire hazard must be provided with exterior easily removable external envelopes.

86. Steeply sloping roofs shall be provided for hot work halls with considerable heat and other hazardous emissions.

87. The roofs of heated buildings shall be made with internal drainage. Roofs with external drainage in heated and unheated buildings shall be permitted provided that measures are taken to prevent the formation of icicles and ice.

88. When designing rooms for work with sources of electromagnetic fields of radiofrequency range it shall be necessary to provide their isolation from other production rooms. Placing sources of electromagnetic fields in common rooms shall be allowed provided that their levels in workplaces of personnel who are not related to

work at the installations and their maintenance do not exceed the maximum permissible values established by current sanitary and epidemiological requirements for radio engineering facilities of the Republic of Kazakhstan.

If it is not possible to ensure this condition, electromagnetic field sources shall be located in separate rooms.

89. In shielded rooms designed to handle electromagnetic field sources, working areas and volumes shall be established pursuant to the dimensions of the products to be handled.

90. In screened rooms, measures shall be taken to compensate for the lack of natural light, ultraviolet light and to modify the gas and ionic composition of the air.

91. The walls, floor and ceiling of shielded rooms shall be covered with absorbent materials.

92. In new and reconstructed facilities where noise sources are located, architectural and construction measures shall be provided to reduce noise inside the premises, in the workplace, and in the area surrounding the residential buildings.

93. Vibration, ultra- and infrasound, provisions shall be made for periodic rest and preventive procedures in the vicinity of workplaces where workers are exposed to noise.

94. Galleries, platforms and ladders for maintenance of hoisting cranes must be designed in concordance with the rules of industrial safety in the operation of hoisting machinery, approved by Order No. 359 of the Minister for Investment and Development of the Republic of Kazakhstan dated December 30, 2014. (registered with the Register of State Registration of Regulatory Legal Acts under No. 10332).

95. For the repair and cleaning of glazing of windows and skylights where the use of mobile or portable floor standing equipment (ladders, rolling platforms, telescopic lifts) is not possible due to the conditions of placement of technological equipment or the overall height of the building, stationary devices must be provided to ensure the safe performance of this work. The use of these devices shall be justified in the technological part of the project.

96. The need for and type of skylights (zenith, U-shaped, light, light-aerial, etc.) shall be determined by the project depending on the technological process itself, sanitary-epidemiological and ecological requirements, with allowance for the climatic conditions of the construction area.

97. A protective metal mesh shall be provided under the glazing of skylights made of silicate sheet glass and insulating glass units, as well as along the inner side of the glazing of rectangular skylights.

98. Mechanisms controlled from the floor or work platforms shall be provided in buildings equipped with opening windows or skylights for adjusting the size of

openings, as well as platforms and mechanisms for cleaning windows, skylights and lighting fittings to ensure convenient and safe performance of such work.

99. In the case of remote and automatic opening, it must also be possible to open the door manually in all cases.

100. Special rooms shall be envisaged in the construction part of the project for the repair, adjustment and control of heating, ventilation and air-conditioning systems and ventilation exhaust treatment installations.

101. The design of newly erected and reconstructed administrative, amenity buildings and premises of industrial enterprises, additional special premises and social amenities, depending on the classification of production processes, must be designed pursuant to the requirements of state regulations in the sphere of architecture, urban planning and construction.

Paragraph 5: Accessibility for persons with reduced mobility

102. In addition to this document, the requirements of national architectural, urban planning and construction regulations must be taken into account when designing workplaces for groups of persons with reduced mobility.

103. Workplaces for persons with reduced mobility shall be envisaged when designing institutions, organisations and enterprises.

104. In production buildings, workplaces for employees with reduced mobility shall be accommodated in the volume-planning structure of the building (scattered or in specialised workshops, production areas and special premises).

105. Workplaces for groups of persons with reduced mobility shall provide safe working conditions, work with little or moderate physical exertion and avoid the possibility of impairment or injury.

106. In the working area (workspace) or room, it shall be necessary to ensure that a set of sanitary and epidemiological requirements for the microclimate are met in conformity with hygienic regulations, as well as additional requirements established pursuant to the type of illness of persons with reduced mobility.

107. Sanitation services for working persons with reduced mobility shall be provided in compliance with the requirements of state regulations in the field of architecture, urban planning and construction.

Paragraph 6. Engineering support

108. The requirements of national regulations in the field of architecture, urban planning and construction must be observed when designing heating, ventilation and air conditioning systems for buildings and premises.

109. Measures, aimed at reducing the entry of excessive heat and cold into the working area via the external envelope and from technological sources, must be taken in new and reconstructed buildings in conformity with the relevant national architectural, urban planning and construction standards for thermal protection of buildings and structures and for heating, ventilation and air conditioning.

110. Mechanical supply and exhaust ventilation systems shall be envisaged, as well as local ventilation with regard to the processes involved where hazardous substances are emitted,.

111. Space shall be allocated for supply air chambers in production buildings.

112. The temperature and air discharge rate of ventilation, air conditioning and air heating units must be determined by calculation pursuant to the national architectural, urban planning and construction standards for heating ventilation and air conditioning with allowance for the microclimate parameters in the working area.

113. Supply air must be directed in such a way that it does not flow through high-pollution areas into lower-pollution areas and does not upset the balance when the local suction is operating.

114. When industries or adjacent premises with emissions of different hazard classes are combined in the same building, the overflow of pollutants must be prevented by providing predominance of exhaust over organised inflow for rooms with more toxic pollutants.

115. The design of the external envelopes of heated industrial premises must exclude the possibility of condensation forming on the internal surface of walls and ceilings. A deviation from this requirement shall only be permitted for rooms with processes that are sources of moisture emission.

116. In multi-storey production buildings, the installation openings in the floor slabs of interstorey platforms shall be fitted with insulating shields and the air exchange must be calculated separately for each floor.

117. Unorganised air supply from adjacent rooms shall be permitted if they are free of foul-smelling substances and the content of harmful substances does not exceed the values of maximum permissible concentrations for atmospheric air in populated areas.

118. Air-conditioning in production buildings and facilities must be envisaged to ensure the optimum permissible climate parameters in the workplace and to create the necessary microclimatic conditions.

119. Emergency ventilation must be provided in rooms where large amounts of hazardous (or flammable) substances may suddenly enter the air in the working area.

120. The activation of emergency ventilation and the opening of apertures for venting must be designed remotely from accessible locations both from inside and outside the rooms.

121. In tunnels designed for intermittent work or movement of people and in rooms on technical floors, periodic ventilation must be provided with a design air exchange rate which ensures normal parameters of the air environment in the working area during the period of work.

122. When designing and reconstructing existing production facilities where noise sources are located, architectural and construction measures must be provided to reduce to permissible indoor noise levels in workplaces as well as on industrial sites.

123. Noise and vibration levels generated by heating, ventilation and air conditioning installations in workplaces must not exceed the standard values.

124. Water supply systems shall be designed and installed for drinking and technical (if necessary) purposes.

The quality of the water supply must comply with current hygiene standards.

125. The water consumption for internal and external firefighting shall be assumed in accordance with the requirements of the national regulations for architecture, urban planning and construction.

126. The connection of the technical water supply system to the potable water supply system and the supply of untreated wastewater to the production equipment and processes shall be prohibited without breaking the stream.

127. When designing recycling water supply systems in blowdown mode, during which contaminated wastewater is generated, the requirements of the applicable sanitary regulations for the protection of surface and groundwater against pollution shall be imposed on their disposal.

128. The sewer network must be enclosed along the entire length and made of non-combustible material. Industrial sewer manholes must be kept clean and closed with lids at all times.

129. Industrial drainage must ensure normal and continuous removal of liquids without stagnation or overflow.

130. Operation of the industrial sewer system with defective or contaminated sewage treatment plants that do not provide the necessary wastewater treatment shall be prohibited.

131. Where aggressive liquids (acids, alkalis) and hazardous substances such as mercury, solvents, bioactive substances may be present, the floor shall be covered with a material that is resistant to these substances, that prevents sorption and that can be cleaned and decontaminated. For the disposal of these substances, the sewage shall be discharged to local wastewater disposal facilities. Such wastewater shall not be discharged into the wastewater disposal systems of the settlements.

132. The operation of the industrial sewerage system must ensure normal and continuous drainage of liquids without stagnation or back-up from the effluent.

133. The pooling of wastewater in sewer networks, that can lead to chemical reactions with the release of poisonous or explosive vapours and gases or with the formation of large quantities of insoluble substances in the pipes, shall be prohibited.

134. A rationally designed modern power supply system for an industrial plant must meet a number of requirements: economy and reliability, safety and ease of operation, ensuring proper power quality, voltage levels and frequency stability.

135. Natural lighting shall be provided in production facilities with permanent occupancy.

136. Changes in natural lighting during the daytime caused by meteorological conditions must not cause a reduction of illumination in the work area below the values established by the artificial lighting standards for the relevant type of work. Reduced natural light shall be compensated by artificial light via automatically switching on the lighting installations in work areas with insufficient light.

137. Systems of natural, artificial and combined lighting shall be designed to ensure that workplaces (permanent and non-permanent) have the following rated values: natural illuminance factor, illuminance of the working surface, glare factor, reflected glare, pulsation factor, brightness, irregularity of luminance distribution.

138. The design of artificial lighting in factories shall include work, emergency, security and duty lighting.

139. The requirements of electrical safety rules shall be complied with, when designing power supply systems for the internal electrical equipment of production buildings.

Paragraph 7: Environmental protection

140. In order to protect the environment, the requirements of the Environmental Code must be taken into account in the design of production buildings.

141. In the process of construction of production buildings, the following must be taken into account:

1) direct impacts - directly caused by the main and associated planned activities in the area where the facility is located;

2) indirect impacts - on the environment that are caused by indirect (secondary) factors arising from the project;

3) cumulative impacts - arising from ever-increasing changes caused by past, present or reasonably foreseeable activities accompanying project implementation.

142. In the environmental impact assessment process, it shall be necessary to assess impacts on:

1) atmospheric air, excluding the impact of greenhouse gas emissions;

2) surface and ground waters;

3) bottom surface of water bodies;

4) landscapes;
5) land resources and soil cover;
6) flora;
7) fauna;
8) state of ecological systems;
9) state of public health;
10) social sphere (employment of population, education, transport infrastructure).

143. The air discharged into the atmosphere by local and general ventilation systems in industrial premises containing harmful (or foul-smelling) substances must be treated and provision must be made to disperse residual quantities of harmful substances into the atmosphere to the levels specified in the applicable atmospheric air health regulations.

144. Dense groups of trees and shrubs preventing the dispersion of pollutants into the atmosphere shall not be placed on the site of enterprises emitting pollutants into the atmosphere.

145. When designing and constructing buildings, the degree of radionuclide hazard of the building site, the presence of technogenic radioactive contamination and the radioactivity of building structures must be taken into account.

Chapter 6: Energy saving and natural resource management

Paragraph 1: Requirements to reduce energy consumption

146. The building shall be designed and constructed to meet the energy efficiency requirements for building systems and parts.

147. In the design process, solutions and a set of measures to improve the energy efficiency of the facility must be provided in conformity with the requirements of the relevant regulations in force in the territory of the Republic of Kazakhstan.

148. Energy-efficient building designs, together with the effective preservation of the specified indoor climate and the reduction of resource intensity in their manufacture, must also be environmentally friendly through the use of new technologies.

149. The implementation of the technological process and the fulfilment of the requirements for the indoor climate shall be carried out with due regard for the economical use of energy resources.

150. It shall be permitted to reduce the temperature of the premises outside working hours.

151. Engineering systems shall be equipped with automatic or manual control of the air supply system. Building heating systems shall be equipped with heat flow control devices.

152. The design shall provide for the correct orientation of the building in relation to the sides of the world. The correct orientation of the building shall contribute to the natural retention of heat in the winter and cooling in the summer and to the insolation of the rooms.

153. To ensure efficient use of heat, the building envelope shall be constructed using energy-saving materials.

154. Energy-efficient insulation and ventilation shall be envisaged in buildings (e.g . air cavity walls and roof insulation, single or double glazing, passive heating and cooling).

155. Energy-saving measures shall be applied in engineering systems (e.g. heat recovery of exhaust air).

156. Improvements in the energy performance of buildings shall take into account climatic and local conditions, as well as indoor climate conditions and cost-effectiveness. These measures shall not affect the other technical requirements of buildings, nor their general accessibility, safety and intended use.

157. There shall be a need to focus on measures to prevent overheating, such as shading, justification of thermal capacity in building construction, and development and application of passive cooling technologies, primarily those that improve the climate around the building and the microclimate inside the building.

158. The possibility (technical, environmental and economic) of installing high efficiency alternative systems shall be envisaged in buildings.

159. System requirements shall apply if they are technically, economically and functionally feasible for:

1) a heating system;
2) a hot water system;
3) air conditioning system;
4) large ventilation systems;
5) a combination of these systems.

Paragraph 2: Sustainable management of natural resources

160. The siting, design, construction and reconstruction of production buildings shall be carried out so as to ensure a favourable condition for the habitat of plants, animals and other organisms and the sustainable functioning of natural ecological systems.

161. In order to rationally use natural resources, it shall be permitted to use used building materials, products and structures at repair, reconstruction and construction sites pursuant to the requirements of state regulations in the field of architecture, urban planning and construction on the reuse of used building materials, products and structures.

162. Landscape plans shall provide for the wise conservation of natural resources such as water, soil, biodiversity, energy resources, air quality and other natural resources in the public interest.

163. In the construction and operation of production buildings, a set of measures to reduce water consumption and increase the efficiency of wastewater treatment must be implemented in order to conserve resources, protect nature and increase economic efficiency in industry.

Annex 2 to Order of the
Chairman of the Committee for
Construction and Housing and Utilities
of the Ministry of Industry and
Infrastructure Development
of the Republic of Kazakhstan
No. 9-NK dated January 20, 2020

BR RK 3.02-29-2019 BUILDING REGULATIONS OF THE REPUBLIC OF KAZAKHSTAN WAREHOUSE BUILDINGS

CONTENT

Chapter 1. Scope of application

1. These building regulations shall apply to the design of warehouse buildings intended for the storage of substances, materials, products and raw materials, including

those housed in buildings of other functional fire hazards, and which do not require special construction measures to maintain the specified internal environment parameters.

2. These building regulations shall not apply to the design of warehouse buildings for dry mineral fertilisers and crop protection chemicals, explosive, radioactive and highly toxic substances, flammable and non-flammable gases, oil and oil products, rubber, celluloid, combustible plastics and film, cement, cotton, flour, mixed fodder, fur, furs and fur products, agricultural products, as well as the design of buildings and premises for cold stores and granaries.

Chapter 2: References to regulatory acts

The following references to regulatory acts of the Republic of Kazakhstan shall be necessary for the application of these building regulations:

1) the Code of the Republic of Kazakhstan of January 9, 2007, the Environmental Code of the Republic of Kazakhstan (hereinafter referred to as the Environmental Code);

2) the Code of the Republic of Kazakhstan of September 18, 2009 "On Public Health and the Health Care System" (hereinafter referred to as the Code);

3) the Law of the Republic of Kazakhstan "On Architectural, Urban Planning, and Construction Activities in the Republic of Kazakhstan" dated July 16, 2001 (hereinafter referred to as the Law);

4) Order No. 1111 of the Minister of Internal Affairs of the Republic of Kazakhstan dated November 29, 2016 "On Approval of Technical Regulations "Requirements for equipping buildings, premises and structures with automatic fire extinguishing systems and automatic fire alarms, warning and evacuation controls in case of fire" (recorded in the Register of State Registration of Regulatory Legal Acts under No. 14858);

5) Order No. 439 of the Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 "On Approval of the Technical Regulations "General Fire Safety Requirements" (recorded in the Register of State Registration of Regulatory Legal Acts under No. 15501);

Note* - When applying, it shall be advisable to check the validity of reference documents using the information catalogues "List of Regulatory Legal Acts and Regulatory Technical Documents in the Field of Architecture, Urban Planning and Construction, Valid on the Territory of the Republic of Kazakhstan", compiled annually as of the current year and relevant monthly newsletters - journals and information indices of standards, published in the current year.

Chapter 3: Terms and definitions

3. The following terms with their respective definitions shall be used in these building regulations:

1) building - an artificial structure consisting of load-bearing and enveloping structures which form an obligatory enclosed volume above ground, used for living or staying people, carrying out production processes as well as for accommodation and storage of material values, depending on the functional purpose. The building may have an underground part;

2) warehouses - buildings equipped with special technological equipment to carry out the entire range of operations for receiving, storing, placing and distributing goods received therein;

3) warehouse logistics is a system for optimizing the business processes of receiving, processing, storage and shipment of goods in warehouses;

4) fire is uncontrolled combustion that creates a threat, causing harm to life and health of people, material damage to individuals and legal entities, public and state interests;

5) platform - a structure similar to a ramp; unlike a ramp, it is two-sided: one side is along the railway track and the opposite side is along the road access;

6) ramp - a structure for loading and unloading operations, one side of which is adjacent to the wall of the warehouse, and the other along the railway track or road access;

7) terminal - a warehouse structure that provides for optimal placement of goods in the warehouse and automated management of interconnections with the external environment, including incoming, outgoing and internal flows;

8) maximum permissible concentration - content of harmful substances in the environment, which, upon constant contact or exposure over a certain period of time, has practically no effect on human health and does not cause adverse effects in their descendants.

Chapter 4. Objectives of regulatory requirements and functional requirements of building regulations

Paragraph 1: Objectives of the regulatory requirements of building regulations

4. The objectives of these building regulations shall be to create a favourable microclimate and safe environment in warehouse buildings for:

1) the proper storage and preservation of material assets;

2) the protection of human health and life against adverse occupational and environmental factors.

Paragraph 2: Functional requirements of the building regulations

5. Functional requirements shall include:

1) ensuring the mechanical safety of storage buildings during all phases of their life cycle;

2) ensuring fire safety of warehouse buildings;

3) compliance with the requirements for the protection of human health and life;

4) protection of the environment.

Chapter 5: Performance requirements for warehouse buildings

Paragraph 1: Mechanical safety requirements for warehouse buildings

6. The required values of parameters characterizing the safety of the building structure and its individual parts or elements shall be justified by:

1) the results of calculations carried out pursuant to approved methods and (or) the results of tests of adequate models or fragments of the building structure;

2) the results of modelling scenarios of the implementation of hazards.

Input data for the calculations shall include statistically justified values of climatic impacts for the construction area, specifics of recurrence and intensity of dangerous natural and man-made impacts, results of engineering surveys in the area to be developed and, if necessary, in the territory of a particular land plot.

The design input data (including results of engineering surveys), calculation and test methods, accepted values of loads and impacts, as well as accepted design values of parameters and other specifics of the building or structure shall meet the requirements of the regulations included in the approved list of national standards and (or) codes of practice, the application of which on a voluntary basis shall ensure compliance with these building regulations.

7. The design of warehouse buildings shall allow for changes in storage technology without substantial alteration of the buildings and their reconstruction for production facilities.

8. The geometric parameters of warehouse buildings - the size of spans, columns and storey heights - shall be determined by the requirements of the operating technology; mobile (inventory) buildings shall comply with the requirements of regulatory documents.

9. The external building envelope of the A and B storage buildings must be designed to be lightly disruptive.

10. Columns and doorframes in warehouse buildings where there is heavy floor traffic shall be protected from mechanical damage and painted.

11. Loading and unloading ramps and platforms shall be designed to protect goods and loading and unloading mechanisms from atmospheric precipitation.

12. The length of the loading and unloading ramp must be determined according to the turnover and capacity of the warehouse and the space planning of the building.

The width of loading and unloading ramps and platforms shall be determined in compliance with the loading and unloading technology and safety requirements.

13. Loading and unloading ramps and platforms shall have at least two scattered stairs or ramps.

14. The design of gates, railway track entrances, skylights, internal gutters, parapets and fixtures for cleaning and repairing glazing of windows and skylights shall be adopted in conformity with the requirements for the design of production buildings.

15. Designs and materials of bases and floor coverings of warehouse buildings shall be designed with due regard for the loads from the stored goods, type and intensity of mechanical impacts of floor transport and dust separation, accumulation of static electricity and spark formation.

16. In food storage areas, the following shall be provided: rodent-proof building material barriers without cavities; solid and void-free leafs for external doors, gates and manhole covers; devices for closing ventilation openings; steel mesh barriers for ventilation openings in walls and ducts, and basement windows (the steel mesh window barriers shall be openable or removable).

The design of such warehouse buildings shall include instructions for the careful sealing of pipe penetrations (in walls, partitions and ceilings) and joints of the building envelope (internal and external walls, partitions between themselves and with floors or ceilings).

Paragraph 2: Fire safety requirements for warehouse buildings

17. To ensure compliance with fire safety requirements, the construction facility shall be designed and constructed in obedience to the Technical Regulations “General Fire Safety Requirements” approved by Order No. 439 of the Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 (recorded in the Register of State Registration of Regulatory Legal Acts under No. 15501) and the Technical Regulations “Requirements for Equipping Buildings, The Technical Regulations “ Requirements for Equipping Buildings, Premises and Structures with Automatic Fire Extinguishing Systems and Automatic Fire Alarms, Notification and Evacuation of People in Case of Fire” approved by Order of the Minister of Internal Affairs of the Republic of Kazakhstan No. 1111 dated November 29, 2016 (registered with the Register of State Registration of Regulatory Legal Acts under No. 14858).

18. Depending on the explosion and fire hazard, warehouse buildings and premises shall be divided into categories A, B, B1-B4 and D depending on the stored substances, materials, products, raw materials and their packaging.

Categories of premises and buildings for explosion and fire hazard shall be established in the technological part of the project as consistent with the requirements of the Technical Regulations “General Fire Safety Requirements” approved by Order No. 439 of the Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 (registered with the Register of State Registration of Regulatory Legal Acts under No. 15501).

Note* - Hereinafter the term “substances, materials, products and raw materials” shall be combined with the term "goods".

19. In the event of fire, the layout and design of warehouse buildings shall ensure:

1) evacuation of workers outdoors to an adjacent area before life and health hazards due to fire hazards occur;

2) the possibility of rescuing workers who do not have time to take cover;

3) the possibility of access of fire brigades and fire extinguishing equipment to the seat of fire and measures for rescuing people and material assets;

4) prevention of fire spreading to adjacent fire compartments and adjacent buildings.

20. Placement of consumable (intermediate) warehouses of raw materials and semi-finished products in production buildings in the quantity established by the technological design norms to ensure a continuous technological process shall be allowed directly in the production premises openly or behind mesh fences. In the absence of such data in the technological design norms, the quantity of the indicated goods shall be established not more than the shift requirement.

21. In single-storey terminal buildings of fire resistance degrees I and II of structural fire hazard class C0, it shall be permitted, if necessary, to construct escape corridors, partitioned by fire barriers of type 1 and provided with air supply in case of fire. In this case, the length of the corridor shall not be included in the calculation of the length of the escape route.

22. High-rack storage buildings of category B shall be designed as single-storey I to IV fire-resistance degrees of C0 class with skylights or exhaust shafts on the roof for smoke extraction.

Smoke exhaust shafts (hatches) shall be located above the aisles between the racks.

23. Ramps and canopies adjacent to buildings of I, II, III and IV fire resistance degrees of C0 and C1 fire hazard classes must be made of non-combustible materials.

24. Systems of automatic fire extinguishing and automatic fire alarm, warning and evacuation control in case of fire shall be provided in obedience to the Technical Regulations “Requirements for Equipping Buildings, Premises and Structures with Systems of Automatic Fire Extinguishing and Automatic Fire Alarm, Warning and

Evacuation Control in Case of Fire" approved by Order of the Minister of Internal Affairs of the Republic of Kazakhstan No. 1111 dated November 29, 2016 (registered with the Register of State Registration of Regulatory Legal Acts under No. 14858).

25. The provision of outdoor and indoor fire water supply to storage buildings must be designed pursuant to the requirements for the design of water supply, outdoor networks and installations, indoor water supply and sewerage.

Paragraph 3: Requirements for hygiene and protection of human health in warehouse buildings

26. The safety of occupants in buildings shall be ensured by sanitary, epidemiological and microclimatic requirements: absence of harmful substances in the air of working areas above the maximum permissible concentrations, minimum heat and moisture release into the premises; absence of noise, vibration, ultrasound, electromagnetic waves, radio frequencies, static electricity and ionising radiation above permissible values; and limitation of physical strain, attention stress and prevention of fatigue of employees as consistent with hygienic standards.

27. The materials used in the structures must not release harmful, flammable and explosive substances, unpleasant smelling substances in quantities exceeding the maximum permissible concentration, as well as pathogenic bacteria, viruses and fungi during operation.

28. The use of tar and tar mastics and other environmentally hazardous materials for flooring shall be prohibited in food storage facilities.

Paragraph 4. Safety and accessibility requirements for use

29. The layout and design of warehouse buildings must be designed to eliminate the possibility of injury to occupants during movement, work, use of mobile devices, technological and engineering equipment.

30. The design of buildings and structures accessible to persons with reduced mobility shall ensure:

1) their accessibility to places of target visitation and unobstructed movement within buildings and structures;

2) safety of motion paths (including evacuation) and places of service and work.

31. To prevent electrocution, design solutions shall include:

1) measures for safe insulation and earthing of electrical installations;

2) the availability of protective disconnection devices;

3) measures to prevent the occurrence of electrical loads on accessible parts of the electrical supply system.

32. The design documentation shall include measures to prevent injuries and accidents as a result of explosions, including

1) compliance with the safety regulations of the heating system device;

2) compliance with the requirements of the manufacturers of heat generators;

3) regulating the heating temperature and pressure in hot water and heating systems ;

4) prevention of an excessive accumulation of explosive substances in the indoor air.

33. The design of storage buildings shall ensure that people are protected:

1) from air noise generated by external sources (outside the building);

2) from airborne noise generated in other rooms of the building or structure;

3) from impact noise;

4) from noise generated by equipment;

5) from excessive reverberating noise in the room.

34. Optimal acoustical conditions shall be provided in rooms and outdoor areas where large numbers of people may be present at the same time and where their safety may depend on the intelligibility of the sound.

35. Outdoor lighting of wastewater facilities shall be of the following types:

1) general, regular lighting;

2) security lighting;

3) standby lighting.

The types of lighting required for a particular facility shall be determined in the project and agreed upon with the client.

36. To ensure safety in alarm situations and other emergencies, emergency and evacuation lighting shall be provided in the design documentation.

Emergency lighting shall have an autonomous power supply that automatically turns on when the operational lighting is switched off.

In storage buildings, emergency and evacuation exits must be signposted.

37. Warehouse buildings shall be equipped with fixed and mobile types of communication.

38. In order to provide protection against unauthorised invasion, the following shall be necessary:

1) warehouse buildings must be equipped with measures aimed at reducing the possibility of criminal activity and its consequences;

2) in cases stipulated by the legislation of the Republic of Kazakhstan, television surveillance, alarm systems and other systems aimed at protection against manifestations of terrorism and unauthorized intrusion shall be installed in warehouse buildings.

Paragraph 5: Requirements for energy savings and reduction of heat consumption

39. In storage areas, the temperature, relative humidity and air velocity shall be adjusted to the requirements of the storage technology.

40. Internal heating and heating systems, ventilation, air conditioning and air heating systems, including outdoor air intakes, emergency ventilation, equipment layout and ducting, fire protection and indoor refrigeration systems, microclimate values in storage buildings shall be accepted in obedience to the requirements for the design of heating, ventilation and air conditioning.

41. Remote monitoring and recording of the main parameters in heating, ventilation and air-conditioning systems shall be provided in conformity with the technological requirements and the design specification.

42. In order to reduce operating energy costs, the building shall be designed with a minimum compactness value equal to the ratio of the surface area of the building envelope to the volume enclosed therein.

43. The project documentation shall reflect the optimisation of the business processes for receiving, processing, storing and shipping goods in warehouses (warehouse logistics) in the development of process automation.

44. When organising the logistics process it shall be necessary to achieve:

1) rational layout of the warehouse in the allocation of working zones, contributing to the reduction of costs and improvement of the processing of goods;

2) efficient use of space when arranging equipment;

3) using versatile equipment that performs various warehouse operations;

4) minimizing intra-warehouse transportation routes;

5) unification of shipment batches and application of centralized delivery;

6) making maximum use of the information system;

7) maximising the proximity of intra-warehouse transport routes to evacuation routes.

Paragraph 6: Requirements for environmental protection and sustainable use of natural resources

45. When designing warehouse buildings, an environmental section must be developed as consistent with the environmental legislation, sanitary and epidemiological requirements and other applicable regulations.

46. On the sites of storage buildings, it shall be necessary to provide for removal of the fertile soil layer in places where it can be disturbed, contaminated, waterlogged or flooded during construction works.

Places and conditions of temporary storage, as well as the procedure for the use of the removed topsoil shall be determined by the authorities providing land plots for use.

47. Emissions into the atmosphere of air removed from storage buildings by general ventilation and containing noxious and foul-smelling substances, as well as the dispersion of these substances shall be taken into consideration so that their concentrations in the atmospheric air of settlements in the vicinity of the storage building do not exceed the maximum permissible concentrations.

Calculations of air pollution generated by ventilation emissions in settlements and on the territory of enterprises shall take into account maximum total emissions of harmful substances, concentrations of these substances in the atmospheric air from technological emissions and background concentrations of harmful substances in the construction area.

48. The design documents shall provide for the disposal of wastewater that is not harmful to the environment.

Annex 3 to Order of the
Chairman of the Committee for
Construction and Housing and Utilities
of the Ministry of Industry and
Infrastructure Development
of the Republic of Kazakhstan
No. 9-NK dated January 20, 2020

BR RK 3.02-09-2019 BUILDING REGULATIONS OF THE REPUBLIC OF KAZAKHSTAN MIXED-USE BUILDINGS AND COMPLEXES

Content

Chapter 1: Scope of application

1. These construction standards shall establish requirements for the location, site, space planning, engineering, interior environment, composition and floor space of mixed-use buildings and complexes.

2. These construction standards shall apply to the design and construction of mixed-use buildings and complexes, including buildings over 50 m in height, as well as to the reconstruction and major renovation of existing facilities for mixed-use buildings and complexes.

3. These building standards shall apply to the design of newly constructed, reconstructed, expanded and modernised mixed-use buildings and complexes.

Chapter 2: References to regulatory acts

The following references to the regulatory legal acts of the Republic of Kazakhstan shall be necessary for the application of these construction standards:

1) The Code of the Republic of Kazakhstan of September 18, 2009 "On Public Health and the Health Care System" (hereinafter referred to as the Code);

2) The Law of the Republic of Kazakhstan of July 16, 2001 “On Architectural, Urban Planning and Construction Activities in the Republic of Kazakhstan (hereinafter referred to as the Law);

3) Decree of the Government of the Republic of Kazakhstan No. 191 of April 3, 2015 "On Approval of the Requirements to the System of Anti-Terrorist Protection of Facilities Vulnerable to Terrorism", (hereinafter - Requirements to the System of Anti-Terrorist Protection of Facilities Vulnerable to Terrorism);

4) Sanitary Rules "Sanitary and Epidemiological Requirements for Administrative and Residential Buildings" approved by Order No. KR DSM-29 of the Minister of Health of the Republic of Kazakhstan dated October 26, 2018 (registered with the Register of State Registration of Regulatory Legal Acts under No. 17769);

5) Order of the Minister of Energy of the Republic of Kazakhstan No. 230 of March 20, 2015 "On Approval of the Rules for Electrical Installations" (recorded in the Register of State Registration of Regulatory Legal Acts under No. 10851) (hereinafter - electrical engineering regulations);

6) Order of the Minister of Internal Affairs of the Republic of Kazakhstan No. 1111 dated November 29, 2016 "On approval of the Technical Regulations "Requirements for equipping buildings, premises and structures with automatic fire extinguishing systems and automatic fire alarms, warning and evacuation control in case of fire" (registered with the Registry of State Registration of Regulatory Legal Acts under No. 14858);

7) Order No. 439 of the Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 "On Approval of the Technical Regulations "General Fire Safety Requirements" (registered with the Register of State Registration of Regulatory Legal Acts under No. 15501);

Note* - When applying, it shall be advisable to verify the validity of reference documents pursuant to information catalogues "List of Regulatory Legal Acts and Regulatory Technical Documents in the Field of Architecture, Town Planning and Construction, Valid in the Territory of the Republic of Kazakhstan", compiled annually as of the current year and relevant monthly newsletters - magazines and information indices of standards, published in the current year.

Chapter 3: Terms and definitions

4. The following terms with their respective definitions shall be used in this building code:

1) atrium is a part of a building in the form of a multi-light space developed vertically with galleries on the floor, which are accessed by rooms of different purposes.

An atrium developed horizontally in the form of a multi-floor aisle (if longer than the height) is called a passageway;

2) landscaped areas - a part of the territory of a natural complex where artificially created gardening complexes and objects are located: a park, garden, square, boulevard , low-developed areas of residential, public, business, municipal, industrial purpose - within which at least 70% of the surface is covered with vegetation cover;

3) plot - an isolated part of a territory of a specific functional (e.g. for a multifunctional complex), construction or landscape designation;

4) built-in facilities - institutions, enterprises and premises located within the dimensions of the building with an overhang of no more than 1.5 m (hereinafter - m) from the longitudinal façade and not more than 6 m from the ends;

5) built-in premises - institutions, enterprises and premises located both within the building boundaries and outside the building boundaries by more than 1.5 m from the side of the longitudinal facade and by more than 6 m from the side of the ends;

6) mixed-use buildings (complexes) - a single architectural group or freestanding buildings designed to accommodate three or more objects of different purposes (two with the presence of rooms or playgrounds for children), performing the main functions, united by a system of engineering, social, functional relationships, meeting modern socio-cultural, technological, urban planning and architectural requirements;

7) mixed-use residential complexes - multi-apartment buildings, with flats of higher comfort, including approximate daily service facilities, primarily for the residents of the complex. There may be a guarded area adjacent to the complex;

8) street, square - territory bounded by the red lines of the street and road network of the city;

9) urban junction - territory of public purpose formed at the intersection of main streets of citywide significance;

10) public (public-business) zone - zone of a populated area intended for placement of administrative, research, public institutions and their complexes, hotels and hotel complexes, business and financial activity centres, cultural, sports, commercial activities, trade and consumer services and public catering, transport, surface and underground garages and open car parks, other buildings and constructions, not requiring special measures for sanitary and environmental protection, including mixed-use buildings and complexes;

11) inter-majority territories - territories bounded by the red lines of class I major streets, boundaries of the territories of urban junctions and near-majority territories;

12) area adjacent to a main street of citywide or district significance;

13) recreation zones - areas in residential settlements intended for organisation and arrangement of leisure places for the population. They include gardens, forest parks, parks and squares, zoos, bodies of water and beaches, aquaparks, landscape architecture, other recreation and tourism facilities as well as buildings and facilities for leisure and (or) recreational purposes. The recreational zone may include protected natural objects located within the borders (boundaries) of a settlement.

Chapter 4. Objectives of regulatory requirements and functional requirements of building regulations

Paragraph 1 Objectives of the regulatory requirements of building regulations

5. The objective of the regulations shall be to create the necessary conditions for work, residence and occupancy in mixed-used buildings and complexes that protect human health, with due account for the efficient use of space and time, while complying with fire, sanitary and epidemiological, ergonomic requirements, mechanical safety, environmental protection, energy efficiency and resource conservation.

Paragraph 2: Functional requirements of the building regulations

6. The foundations and supporting structures of mixed-use buildings and complexes shall withstand the combination of anticipated impacts that they experience during construction or reconstruction and operation during the design lifetime.

7. Mixed-use buildings and complexes shall be equipped with automatic fire alarm systems, automatic fire extinguishing and fire warning systems.

8. In Mixed-use buildings the necessary comfortable conditions for the life of people shall be created to protect their life and health during the operation of the building, with account taken of the landscaping, architectural and planning solutions and sanitary and epidemiological requirements.

9. Mixed-use buildings and complexes must be designed and constructed so that during their service life, when people live and stay in them they do not pose a threat to human health related to indoor air pollutants, lighting, insolation, sun protection, noise, vibration and radiation.

10. Water supply and plumbing systems shall be designed and constructed so as to ensure a continuous supply of water in the required quantity.

11. Sewerage systems shall be designed and constructed so as to ensure the timely disposal of liquid effluents without leakage, without their release into the water supply system, soil, the environment, without odours being released into the environment.

12. Buildings shall be waterproofed to prevent the penetration of atmospheric moisture into the premises, the occurrence of dampness, and in the case of water leaks or liquid effluents from water supply and sewerage systems, the localisation of the source of the accident within the premises.

13. Mixed-use buildings and complexes and adjacent areas shall be designed and constructed so as to provide unhindered access of people, including persons with reduced mobility, to the areas in conformity with their purpose.

14. Mixed-use buildings and complexes and their surroundings shall be designed and constructed so as to reduce the likelihood of injury to persons.

15. The building shall be designed and constructed to be energy efficient for building systems and parts.

16. Buildings shall be designed, constructed and demolished in such a way that the use of natural resources is integrated, and in particular to guarantee the reuse of building structures, their materials and parts after demolition, the use of environmentally compatible raw and recycled materials.

17. At the design stage of mixed-use buildings and complexes, the relevance of the facility to the list of facilities of the Republic of Kazakhstan vulnerable to terrorism shall be determined and the measures shall be taken to build an appropriate system of anti-terrorist protection of the facility in accordance with the Requirements to the system of anti-terrorist protection of facilities vulnerable to terrorism.

Chapter 5: Performance requirements for the design and construction of mixed-use buildings and complexes

Paragraph 1: General provisions

18. Mixed-use buildings and complexes shall be designed in obedience to the requirements of sanitary regulations "Sanitary and Epidemiological Requirements to Administrative and Residential Buildings" approved by Order No. KR DSM-29 of the Minister of Health of the Republic of Kazakhstan dated October 26, 2018. (registered with the Register of State Registration of Regulatory Legal Acts under No. 17769) and other regulatory and technical documents establishing requirements for the design, construction and operation of mixed-use facilities.

19. The main feature of modelling a mixed-use facility shall be the integrated solution of urban planning and typological issues.

20. Mixed-use buildings and complexes shall be designed and constructed in such a way that a unified organisation of the communicative structure is created, providing comprehensive access for people to various services and processes, complemented by the creation of a social environment that meets people's need for communication.

21. Mixed-use buildings and complexes shall create an architectural composite dominant of the city and at the same time tactfully fit into the surrounding built environment.

22. Standards for the planning of interior space shall be ensured:

1) a safe, comfortable and productive environment for all employees and visitors;

2) make efficient use of the building's heating, air-conditioning and ventilation, electrical and mechanical systems;

3) maintain the adaptability of the building to allow for organisational change;

4) provide ventilation and natural light to workplaces;

5) make efficient use of space and create the necessary human mobility system in the building, appropriate systems to regulate the density and direction of human flows must be in place.

23. Mixed-use buildings and complexes shall be designed and constructed so as to ensure time and public convenience combined with the efficient use of urban transport and land.

24. The mixed-use buildings and complexes must be proportionate to human proportions and ergonomic.

25. Mixed-use buildings and complexes shall be divided into groups pursuant to their functional specificity:

1) residential mixed-use buildings complexes;

2) mixed-use public buildings.

26. The composition and areas of mixed-use buildings and complexes, and the mutual arrangement of the objects designed therein, shall be determined based on the required parameters in each particular case.

27. Subways, galleries with ramps and moving pavements, inclined lifts, climate-controlled roofed walkways, 'aerial bridges' connecting buildings, structures on different levels shall be used as complex communication facilities and devices.

28. The number of above and below ground floors must be established in obedience to urban planning requirements and the geology of the allocated site.

Floor heights and room heights shall be determined according to operational necessity, but not less than those established in current regulations.

29. When designing planning and development, the norms of insolation and illumination of territories and premises shall be ensured in compliance with the requirements of the relevant state regulations in the field of architecture, urban planning and construction, approved pursuant to subparagraph 23-16) of Article 20 of the Law (hereinafter - state regulations in the field of architecture, urban planning and construction).

30. Outdoor engineering networks must be designed in conformity with the requirements of the corresponding state regulations in the field of architecture, urban planning and construction.

31. Dust collection and rubbish disposal systems in buildings shall be determined in compliance with the operational needs of the individual institutions that make up the mixed-use buildings and complexes.

32. The waste room area of a residential section shall be calculated pursuant to the number of people living in that section.

Paragraph 2: Site requirements

33. The basic requirements for building plots and areas to accommodate mixed-use buildings and complexes shall be established based on the specific architectural and urban planning situation and in obedience to the requirements of state regulations in the field of architecture, urban planning and construction.

34. Development areas shall be determined in conformity with the requirements for public buildings and linked to the system of existing transport and pedestrian routes or provide a perspective for neighbouring areas.

35. The size of the site shall be determined with due regard for the urban situation, environmental characteristics, specialisation and functional composition.

Site dimensions must be limited for the normal functioning of the global urban transport scheme.

36. Minimum distances between buildings shall be taken depending on their degree of fire resistance and fire hazard class in conformity with the requirements of the Technical Regulations "General Fire Safety Requirements" approved by Order No. 439

of the Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 (registered with the Register of State Registration of Regulatory Legal Acts under No. 15501);

37. The location of mixed-use buildings and complexes on the territory of cities, towns and other settlements shall be determined as part of or on the basis of city planning plans for the development of territories, districts and territory planning projects.

38. The design of residential and public multifunctional buildings and complexes must comply with:

1) intensity of use of the territory, urban nodes, near-road and inter-road areas;

2) requirements for the protection of historical and cultural monuments, preservation of historical layout and development in compliance with the Rules for the Protection and Maintenance of Historical and Cultural Monuments, approved by Order No. 157 of the Minister of Culture and Sport of the Republic of Kazakhstan dated December 29, 2014. (recorded in the Register of State Registration of Regulatory Legal Acts under No. 10163);

3) environmental and recreational zone protection requirements;

4) sanitary and hygienic standards;

5) fire safety requirements.

39. For the efficient and convenient distribution and movement of people between buildings and areas, an appropriate system of different roads must be organised, also ensuring safety and practicality.

40. A separate pathway for cyclists, conveniently connected to the building and to the pedestrian pathway, shall be provided.

41. When reconstructing in order to ensure the continuity of development and increase the diversity of the environment, the positive qualities of the reconstructed environment must be preserved (recreated): the orientation of buildings in relation to the streets, the scale ratio of open and built-up spaces, courtyards, landscaping, landscaping.

45. Pedestrian paths shall be provided with adequate clearance for unobstructed passage.

43. Pedestrian walkways shall be provided with lighting and noise protection.

44. Fittings area with bins, lanterns, post boxes and so on shall be provided.

45. The size (capacity) of open and enclosed (including underground) parking areas within mixed-use buildings and complexes shall be determined by calculation. The distance from windows of buildings to above-ground car parks, to entrances and exits shall be taken with the provision of access for fire-fighting vehicles in obedience to the requirements of regulatory and technical documents for car parks.

Parking area with convenient entrances and exits shall be created in the layout of the area.

46. Parking garages on the territory of mixed-use buildings and complexes (built-in , built-in-attached, underground) shall be designed in conformity with the requirements for car parks.

47. Landscaping shall be designed as consistent with the requirements of current regulatory and technical documents on the landscaping of residential areas.

Paragraph 3: Building safety requirements for fires and other emergencies

48. The fire resistance limits of load-bearing and enclosing structures shall be taken pursuant to the current fire safety regulations.

49. Buildings must be located with the allowance for the possible behaviour of the building or its elements during a fire so that the latter cannot be spread to neighbouring buildings under the most adverse weather conditions.

50. Buildings must have passageways, passageways and entrances that provide unobstructed access from all sides for fire, rescue and medical services equipment.

51. The building shall be designed and constructed using such building materials, products and structures so as to enable the prevention or reduction of the risk of the outbreak and spread of fire, and in the event of fire, the stability of the supporting structures for the duration of the evacuation of people to an area free of fire hazards, including those with limited physical mobility.

52. Combustion appliances shall be installed in buildings so that they will not cause uncontrolled combustion or explosion, and electrical equipment shall have a low potential as a source of ignition.

53. Buildings shall be designed and constructed so that if a fire cannot be quickly extinguished, it is ensured that the spread of the fire beyond its source is limited.

54. Mixed-used buildings and complexes shall be designed as part of institutions, organizations and enterprises (groups of premises) to take into account the compatibility of the psycho-physiological capabilities of the contingent, including the psychophysically vulnerable, during the evacuation of people from the buildings in case of fire.

55. Evacuation routes and exits shall ensure safe evacuation of people in case of fire in obedience to the requirements of the Technical Regulations “General Fire Safety Requirements” approved by Order No. 439 of the Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 (registered with the Register of State Registration of Regulatory Legal Acts under No. 15501).

56. Fire safety requirements for mixed-use buildings and complexes, class of buildings on fire hazard and degree of fire resistance of mixed-use buildings and complexes shall be determined by the Technical Regulations “General Fire Safety

Requirements" approved by Order of the Minister of Internal Affairs of the Republic of Kazakhstan No. 439 dated June 23, 2017 (recorded in the Register of State Registration of Regulatory Legal Acts under № 15501) and current regulatory and technical documents in the field of fire safety.

57. Mixed-used buildings, parking garages and basements built into multifunctional buildings shall be protected with automatic fire alarms, automatic fire extinguishing, warning and evacuation control systems in case of fire in compliance with the requirements of the Technical Regulations "Requirements for equipping buildings, premises and structures with automatic fire extinguishing and automatic fire alarms, warning and evacuation control systems in case of fire" approved by Order of the Minister of Internal Affairs of the Republic of Kazakhstan (registered with the Register of State Registration of Regulatory Legal Acts under No. 14858).

58. The location of the sauna in a mixed-use building shall be determined according to operational needs.

59. Car parks built into residential buildings must have a fire resistance rating of at least the fire resistance rating of the building in which they are built into.

60. Cable installations in electrical shafts and recesses must be equipped with fire protection equipment in accordance with current regulatory and technical documents for equipping buildings with automatic fire alarm systems.

61. If facades of buildings are equipped with lifting devices for repair and cleaning of facades, these devices shall be calculated for use by firefighting units, including for rescuing people.

62. Standards for equipment of automatic fire alarm systems, automatic fire extinguishing and fire warning systems shall be taken in compliance with the requirements of the Technical Regulations "Requirements for equipping buildings, premises and structures with automatic fire extinguishing and automatic fire warning systems, warning and evacuation control systems in case of fire" approved by Order No. 1111 of the Minister of Internal Affairs of the Republic of Kazakhstan dated November 29, 2016. (registered with the Register of State Registration of Regulatory Legal Acts under No. 14858), as well as state regulations in the field of architecture, urban planning and construction.

63. The premises of the building shall be equipped with internal firefighting water piping as consistent with the requirements of state regulations in the field of architecture, urban planning and construction.

64. Fire safety requirements for lift arrangements shall be performed in obedience to the current fire safety regulatory and technical documents. Internal fire hydrants shall be provided in lift halls (air locks) for transportation of firefighting units.

65. Exits from lifts on the floors (except those exiting to the lobby) must be provided through lift halls that are separated from adjoining corridors and rooms by fire partitions with self-closing doors and exits from fire lifts - through vestibules.

Lift lobbies may be separated from adjacent corridors by partitions in obedience to applicable requirements of state standards in the field of architecture, urban planning and construction.

66. Electrical switchboards shall be provided for each fire compartment.

67. Installation of electromagnetic locks on evacuation routes from rooms with children and on staircases leading from these rooms shall be prohibited.

Paragraph 4. Requirements for the protection of human health in the operation of buildings

68. Mixed-use buildings and public complexes shall meet certain requirements in the socio-cultural aspect, provide full life cycles of the complex and free choice of services, attractiveness and comfort of the environment in the place of location, providing improvement of the quality of social infrastructure of cities and human settlements.

69. The spatial structure of multifunctional buildings and complexes shall provide a clear separation of human flows and technological links between different institutions, organizations and enterprises forming multifunctional buildings and complexes.

70. Where groups of public spaces are included in mixed-use buildings and complexes, they must be provided with isolated entrances from the street.

71. The height of public spaces in mixed-use buildings and complexes shall be determined in accordance with the requirements of current regulatory and technical documents on the design of public buildings, operational necessity, but not less than the requirements of the relevant building codes.

72. When designing mixed-use buildings and complexes, in addition to this regulatory document, the requirements of regulations for various institutions and businesses must be taken into account.

73. Large institutions and integrated (universal) service establishments with complex technological processes (department stores, department stores, order shops, convenience stores, households, integrated catering establishments, restaurants, cultural centres, large cinemas, as well as offices, hotels and the like) must have independent entrances and exits.

74. The roof level of in-built (attached) public establishments in areas adjoining the residential part of the building must not exceed the floor level of the residential premises.

75. Objectives of internal space regulations and planning guidelines:

1) to ensure a safe, comfortable and productive environment for all employees and visitors;

2) to provide efficient use of the building's heating, air-conditioning and ventilation system, electrical and mechanical systems;

3) to maintain the adaptability of the building to allow for organisational change.

76. The living quarters located in mixed-use buildings and complexes must be functionally and planographically segregated and have isolated exits in conformity with fire safety requirements.

77. The composition and area of the flats in the residential part of the complex, and their percentage ratio shall be adopted on a case-by-case basis.

78. The design of living spaces (common rooms, living rooms and bedrooms) without natural light or in the ground floors of mixed-use buildings and complexes shall be prohibited.

79. The living space must be designed in compliance with national regulations on architecture, urban planning and construction.

80. The need for lifts depending on the building's storey, the number and types of lifts shall comply with the requirements of the current regulatory and technical documents for public buildings.

81. The need for passenger escalators and moving walkways shall be determined on a case-by-case basis.

82. Low-capacity lifts shall be provided for catering facilities and for connecting commercial and industrial services with consumers on the floors. Shipment of products , laundry, consumables and the like to the floors of buildings, including hotels, shall be also permitted using cargo and passenger lifts.

83. List of sanitary and epidemiological requirements for mixed-use buildings and complexes shall be formed from provisions for public buildings and constructions, state regulations in the field of architecture, urban planning and construction.

84. The possible occurrence of excessive noise during their operation, including those caused by increased static pressure in engineering communications must be excluded in the design of engineering systems.

85. Premises with noise and vibration generating engineering or technical equipment may be located adjacent to, above or below living or service rooms provided that the noise and vibration parameters in the said living and service rooms are maintained by the use of special devices or equipment with low noise and vibration parameters, as evidenced by an appropriate calculation.

86. The soundproofing of walls and ceilings in mixed-use buildings and complexes must comply with the requirements of state regulations in the area of architecture, urban planning and construction.

87. The design of the waste disposal system must be guided by the requirements of current regulatory and technical documents on the design of waste disposal chutes.

88. Waste chutes in each section of a high-rise building may have separate height service areas. To reduce gravitational velocities, dampers shall be provided on the technical floors and shall not interfere with the discharge of waste and the operation of the cleaning device.

89. Foundations and supporting structures shall be designed using characteristic numerical values of impacts and safety factors, shall be constructed in compliance with technological standards and shall be operated in compliance with preventive and protective measures.

90. The load-bearing frame of high-rise buildings shall be designed in reinforced concrete or steel structures with fire protection only by structural means, and the durability of these structures shall correspond to the design life of the building before major renovation. Manholes shall be provided to check the fire protection.

91. Provision shall be made to protect against vibration loads within the specified parameters and against adverse deformation of buildings and structures located in the area adjacent to the projected structure.

92. The design and calculation of the load-bearing structure shall take into account:

1) durability;

2) serviceability;

3) the required load-bearing capacity.

93. The load-bearing structures of the building must retain their properties in compliance with the requirements of the regulations in force for the intended service life, if the specified standards are complied with.

94. The load-bearing structures of the building, which determine the strength and stability of the building as well as the service life of the building as a whole, must retain their properties within the allowable limits, with due regard for the requirements of the building code for building structures made of the respective materials.

95. Elements, parts and equipment with service lives shorter than the expected service life of the building must be replaced in conformity with the established maintenance intervals.

96. Structures and parts shall be made of materials that are resistant to the possible effects of moisture, low temperatures, aggressive environment, biological and other adverse factors in obedience to state regulations in the field of architecture, urban planning and construction.

The necessary protective compositions and coatings shall be applied pursuant to the requirements of the applicable regulatory documents.

97. In the construction of buildings in areas with difficult geological conditions subject to seismic impacts, subsidence and other ground displacements, including frost heave, the inputs of engineering communications shall be carried out with the account taken of the need to compensate for possible deformations of the foundation in

accordance with the requirements established in the regulatory documents on various engineering networks.

98. To ensure safety in the design of mixed-use buildings and complexes, the load-bearing structures must be monitored.

99. To monitor high-rise buildings and structures it shall be necessary to ensure:

1) increase in the level of operational safety achieved via the use of modern systems that provide real-time information on changes in the technical condition of the building;

2) minimizing the influence of human factor in assessing the results of technical monitoring;

3) use of specialised intelligent software for monitoring systems based on modern information technologies, developed taking into account the results of preliminary field tests, theoretical calculations and modelling;

4) possibility of integration with urban systems and databases to improve responsiveness in critical situations.

100. Multipurpose buildings and complexes and their surroundings shall be designed and constructed so as to minimize the possibility of accidents, personal injury and life-threatening hazards resulting from the movement of pedestrians, including children and the elderly, movement of bulky objects and vehicles, unauthorized access, use of electrical appliances and installations, lifts or other engineering equipment when the established operating requirements are met.

101. Mixed-use buildings and complexes, and adjacent areas must be designed and constructed so that glass and other fragile materials that people come into contact with do not cause injury.

102. Mixed-use buildings and complexes and adjacent areas shall be designed and constructed so as to reduce the likelihood of unintentional falls of people from one level to another.

103. Buildings shall allow for the safe maintenance and care of building structures and equipment.

104. Lightning protection of multipurpose buildings and complexes shall be carried out in obedience to applicable regulations.

105. Radiation safety in multifunctional buildings and complexes shall be ensured pursuant to the requirements of current regulatory and technical documents.

106. The water supply and sewage systems in mixed-use buildings and complexes must be designed in conformity with the requirements of state regulations in the field of architecture, urban planning and construction.

107. The hydrostatic head in domestic and drinking water supply systems must be taken as consistent with applicable standards.

108. Ring-bridges of cold and hot water supply systems shall be prohibited within flats.

109. An independent sewer network with an independent outlet to the outdoor network must be designed in mixed-use residential buildings and complexes for built-in public spaces of the lower floors of the building.

110. Water from internal drainage systems must be discharged into a rainwater sewer system in the courtyard and discharged.

111. Water supply, sewerage and drainage systems shall be designed for the maximum possible service life, providing the necessary capacity of pipelines, the required pressure, temperature of hot water, stability against the failure of hydraulic gates of sanitary devices, the non-clogging of sewage and drainage pipelines.

112. A continuous supply of water in the required quantity shall be provided when designing and constructing water supply systems.

113. Control of internal fire water systems shall be provided from a central fire protection system control panel.

114. Heating, ventilation, air conditioning and emergency smoke ventilation in multifunctional buildings and complexes must be designed in compliance with the requirements of state regulations in the field of architecture, urban planning and construction and the requirements of this chapter.

115. Heating, hot water supply, ventilation and air conditioning systems (hereinafter referred to as internal heating systems) shall be primarily supplied from district heating networks.

116. The connection of the internal heat supply systems to the heat source network shall be provided through a heat point. The heat point shall provide for automatic regulation of equipment operation and transmission of information on heat carrier parameters to the control room.

117. The heating systems of the underground car park shall be connected to the heating network according to the dependent scheme. These systems can be connected independently from a separate heat exchanger or by separate pipelines from the distribution and collection collectors of the internal heat supply systems.

118. Fine filters shall be installed on the supply and return pipelines of the heating system.

119. It shall be permitted to design central or local (separate type) air conditioning systems.

120. Air ducts of any ventilation system for non-residential premises must not be routed through residential premises.

121. Noise and vibration protection measures must be provided in supply and exhaust ventilation systems.

122. The gas supply in mixed-use buildings and complexes must be designed in obedience to the requirements of state standards for architecture, urban planning and construction.

123. The design of electrical equipment in mixed-use buildings and complexes shall be guided by the electrical safety rules, the requirements of state regulations in the area of architecture, urban planning and construction, as well as the following requirements:

Artificial lighting of mixed-use buildings and complexes shall be performed in conformity with the electrical safety rules.

The reliability of the power supply to the mixed-use buildings and complexes shall be in accordance with the electrical safety rules.

A diesel power station shall be provided as a backup power supply source.

The diesel power plant may be built in and located in the underground floors of the multifunctional building or complex if the requirements set out in the current regulatory and technical documents on the design of civil defence protective structures and automatic fire extinguishing and smoke removal arrangements are met.

A diesel power plant shall be maintained by a specialised organisation pursuant to approved regulations.

Electrical networks must be equipped with protective disconnection devices in accordance with electrical safety rules.

The minimum distances from freestanding transformer stations to buildings must be established on a case-by-case basis, depending on the urban planning conditions, in consultation with the state authority for the sanitary and epidemiological welfare of the population

The design of communications and automated information and control systems must be guided by current state regulations on the design of communications systems, as well as guiding documents on the design of alarm systems, closed-circuit television and intercom systems.

Anti-terrorist protection systems in the design of multifunctional buildings and complexes shall be provided in compliance with the requirements established in Decree No. 191 of the Government of the Republic of Kazakhstan dated April 3, 2015 “On Approval of the Requirements to the System of Anti-Terrorist Protection of Facilities Vulnerable to Terrorism”.

For mixed-use buildings and complexes, the level of communication, alarm and other networks shall be determined on a case-by-case basis.

The design of low-current systems shall take into account the design features of the building with separation into fire compartments.

Buildings shall be provided with fire protection system in obedience to the requirements of technical regulations “General Fire Safety Requirements” approved by

Order of the Minister of Internal Affairs of the Republic of Kazakhstan No. 439 dated June 23, 2017 (registered with the Register of State Registration of Regulatory Legal Acts under No. 15501), "Requirements for equipping buildings, premises and structures with automatic fire extinguishing and automatic fire alarm, warning and evacuation control in case of fire" approved by order (recorded in the Register of State Registration of Regulatory Legal Acts under No. 14858), as well as state regulations in the field of architecture, urban planning and construction.

Buildings with underground and in-built car park shall be provided with a smoke protection system in compliance with the requirements of technical regulations " General Fire Safety Requirements" approved by Order of the Minister of Internal Affairs of the Republic of Kazakhstan No. 439 dated June 23, 2017 (registered with the Register of State Registration of Regulatory Legal Acts under No. 15501), as well as state standards in the field of architecture, urban planning and construction.

The dispatching must be carried out in conformity with the technical conditions for connection to the dispatching system and to the extent, based on the current regulatory-technical documents on the construction of communication systems.

Mixed-use buildings and complexes and adjacent areas shall be designed and constructed to ensure unimpeded access for all people, including but not limited to people with reduced mobility, to the areas in accordance with their purpose.

The design of mixed-use buildings and complexes shall include specific measures for accessibility for people with reduced mobility and other groups with reduced mobility factoring in local conditions and additional requirements.

Persons with reduced mobility and other groups with low mobility must be provided with unhindered access to the lobby, lifts, public areas and flats.

Ramps (or lifts for wheelchair users and persons with reduced mobility) must be provided at gradients at building entrances, lift entrances, trash chutes and corridors, as well as other necessary devices and adaptations for all groups of people with reduced mobility, in obedience to state standards for architecture, urban planning and construction.

The design of such lifts shall not reduce the calculated (minimum) width of evacuation routes.

Parking spaces for wheelchair-accessible persons shall be provided in parking garages and car parks.

Architectural and planning solutions shall meet all the requirements of creating a complete living environment with due account for the needs of physically challenged people and other groups of people with reduced mobility pursuant to the requirements of state regulations in the field of architecture, urban planning and construction.

The priority of environmental protection, efficient use of natural resources, health protection and the formation of a safe living environment for the population shall be

ensured when developing the design documentation of a mixed-use building or complex. General environmental and sanitary-hygienic requirements, compliance with which is mandatory in urban planning, shall be established by the relevant laws of the Republic of Kazakhstan.

When developing design documentation at all design stages, the impact of planned economic activities on the environment shall be assessed in concordance with the requirements of regulatory documents and atmospheric air quality changes as a result of the implementation of design solutions by calculating air pollution levels from all types of pollution sources with the account taken of the relief, planning organization, microclimatic conditions of the territory, including the aeration regime.

All requirements of regulatory legal acts, normative and technical documents and documentation regulating activities of sanitary and epidemiological service institutions of the Republic of Kazakhstan shall be taken into account.

In order to prevent the formation of gassiness zones and to localise them, the planning solutions of mixed-use buildings and complexes shall be developed against the background of the aeration conditions of the areas and ensure hygienic standards of atmospheric air quality for the mixed-use building and complex.

The protection measures to be developed for the mixed-use building or complex shall include urban planning, architectural planning, construction and acoustic measures:

1) provision of functional zoning of the area and formation of the development factored in the required degree of acoustic comfort;

2) arrangement of sanitary protection zones;

3) application of planning and volumetric-spatial solutions using noise protection properties of the environment;

4) use of noise barrier screens placed between noise sources and noise protection facilities;

5) reinforcement of sound insulation of external enclosing structures.

Mixed-use buildings and complexes shall be located in an area that complies with environmental requirements to minimize the negative impact on the environment, including the removal and disposal of solid domestic and industrial waste.

Chapter 6. Energy conservation and natural resource management requirements

Paragraph 1: Energy efficiency requirements for buildings

124. Buildings and their heating, cooling, lighting and ventilation installations shall be designed and constructed so that the amount of energy they use is low in relation to climatic conditions.

125. Engineering systems of buildings and complexes shall have automatic or manual control of air temperature.

126. Heating systems of buildings and complexes shall be equipped with appliances to reduce the required heat flow when not in use.

127. In the event of a centralized supply of cold and hot water, electricity, gas and heat, and several groups of premises belonging to different organizations or owners in buildings and complexes, each such group of premises must be equipped with energy and water flow meters.

128. Insolation of rooms shall be carried out by creating appropriate parameters such as window size, colour and reflectivity of surfaces, and ceiling heights.

Paragraph 2: Requirements for the sustainable use of natural resources

129. The assessment of the condition of soils in the development area of a mixed-use building or complex shall be carried out in obedience to the requirements of the documents regulating the activities of sanitary and epidemiological service institutions of the Republic of Kazakhstan.

130. A system of measures to protect the soil from erosion, water and wind, to restore and improve the fertility of soils destroyed by erosion and to involve these wastes in rational economic use shall be provided for.

131. Buildings shall be designed, constructed and demolished in such a way that the use of natural resources is integrated, and in particular to guarantee the reuse or recycling of building structures, their materials and parts after demolition, the durability of buildings, the use of environmentally compatible raw and recycled materials.

132. Buildings shall be designed and constructed in a way that reduces the consumption of potable water, including irrigation and sewage water.

Annex 4 to Order of the
Chairman of the Committee for
Construction and Housing and Utilities
of the Ministry of Industry and
Infrastructure Development
of the Republic of Kazakhstan
No. 9-NK dated January 20, 2020

BR RK 5.03-02-2019 BUILDING REGULATIONS OF THE REPUBLIC OF KAZAKHSTAN PRODUCTION OF PREFABRICATED REINFORCED CONCRETE STRUCTURES AND PRODUCTS

CONTENT

Chapter 1. Scope of application

1. These building regulations set out the requirements for the production of prefabricated reinforced concrete structures and products.

2. These Building Regulations shall apply to the production of elements of precast reinforced concrete building structures of heavy, light, fine-grained, heat-resistant and tensile concrete for all types of construction.

3. These Building Regulations are intended to be applied by all manufacturers of precast reinforced concrete structures and products, and are taken into account in the design of new and technical re-equipment of existing enterprises of precast reinforced concrete.

4. These building regulations shall not apply to the production of products from cellular and dense silicate concrete, polymer concrete, polymer cement concrete and fibre concrete.

Chapter 2: References to regulatory acts

The following references to the regulations of the Republic of Kazakhstan shall be necessary for the application of these building regulations:

1) the Code of the Republic of Kazakhstan of January 9, 2007 “The Environmental Code of the Republic of Kazakhstan” (hereinafter referred to as the Environmental Code);

2) the Code of the Republic of Kazakhstan of September 18, 2009 “On Public Health and the Health Care System” (hereinafter referred to as the Code);

3) the Law of the Republic of Kazakhstan "On Architectural, Urban Planning, and Construction Activities in the Republic of Kazakhstan" dated July 16, 2001 (hereinafter referred to as the Law);

4) Order of the Minister of Internal Affairs of the Republic of Kazakhstan No. 439 dated June 23, 2017 "On approval of technical regulations “General Fire Safety Requirements” (registered with the Register of State Registration of Regulatory Legal Acts under No. 15501);

Note* - When applying, it shall be advisable to verify the validity of reference documents using the information catalogues “List of Regulatory Legal Acts and Normative Technical Documents in the Field of Architecture, Urban Planning and Construction, Valid on the Territory of the Republic of Kazakhstan”, compiled annually as of the current year and relevant monthly newsletters - journals and information indices of standards, published in the current year.

Chapter 3: Terms and definitions

5. The following terms with their respective definitions are used in these Building Regulations:

1) prestressed reinforcement - reinforcement that receives initial (prestressing) stresses during manufacture of structures prior to application of external loads during operation;

2) heavy concretes - dense concretes with cement binder and dense coarse and fine aggregates

3) corrosion resistance of reinforcement in concrete - ability of steel reinforcement to preserve its properties as a result of its chemical or electrochemical interaction with corrosive medium

4) frost resistance of concrete - ability of concrete to retain physical and mechanical properties under repeated alternating freezing and thawing, it is regulated by frost resistance grade F;

5) protective layer of concrete - thickness of concrete layer from the edge of the element to the nearest surface of the reinforcement bar;

6) fire resistance of concrete - the ability of concrete in the structure to retain its load-bearing and fire-retarding capacity in case of fire (exposure to fire);

7) permeability of concrete - property of concrete to let gas or liquid through in the presence of pressure gradient (regulated by water resistance grade W), or to provide diffusive permeability of substances dissolved in water in the absence of pressure gradient (regulated by standard values of current density and electric potential)

8) concrete density - the concrete characteristic which is equal to the ratio of its mass to its volume, it is regulated by the average density grade D;

9) working reinforcement - reinforcement installed according to the calculation;

10) lightweight concrete - concrete with a density (in dry condition) of at least 800 kg/m3 but not more than 2000 kg/m3. Manufactured with full or partial use of lightweight aggregates;

11) tensile concretes - special concretes based on tensile cement, expanding during hardening and designed to create a pre-stress (self-stressing) in the structure during its hardening;

12) structural reinforcement - reinforcement installed without calculation for structural reasons;

13) structural reliability - property of the structure to perform the set functions, keeping the values of the set operational indicators in time within the limits corresponding to the required modes and conditions of use, maintenance, repairs, storage and transportation;

14) structural fire protection is a method of fire protection based on the creation of a thermal insulating layer of fire retardant on the heated surface of the structure, which does not change its thickness when exposed to fire. Structural fire protection shall include flame retardant sprayed compositions, coatings, cladding with fire retardant slabs, sheets and other materials, including framing, with air interlayers, as well as combinations of these materials, including thin layer blowing coatings. The method of attachment to the structure is strictly as prescribed in the test report;

15) reinforced concrete structures - structures made of concrete with working and structural reinforcement (reinforced concrete structures);

16) durability - property of building structures, buildings and constructions to withstand chemical, physical and other impacts for a long period of time without deterioration of design characteristics.

Chapter 4. Objectives of regulatory requirements and functional requirements of building regulations

Paragraph 1: Objectives of the regulatory requirements of building regulations

6. The objectives of the statutory requirements of these building regulations shall be to ensure safety, reliability, maintainability in the production of prefabricated reinforced concrete building elements and products, to protect life, health and animals, property and the environment, to ensure energy efficiency and resource conservation.

Paragraph 2: Functional requirements of the building regulations

7. Prefabricated reinforced concrete structures and products shall be manufactured to ensure their safety, durability, serviceability and ability to withstand various physical, chemical and technological influences without damage or destruction.

8. Safety, serviceability and durability of prefabricated reinforced concrete structures and products shall be ensured by meeting the requirements for concrete and its components, reinforcement, technological parameters in the manufacture of concrete and reinforced concrete structures.

9. In the production of prefabricated reinforced concrete structures and products, the requirements of the state regulations in the field of architecture, urban planning and construction, approved pursuant to sub-paragraph 23-16) of article 20 of the Law (hereinafter - state regulations in the field of architecture, urban planning and construction) shall be strictly observed.

10. Production of prefabricated reinforced concrete structures and products shall be carried out taking into consideration the necessary fire resistance limit, selection of reliable fire protection methods during the whole estimated time of fire impact with the absence or limitation of ignition and spread of fire.

11. Production of prefabricated reinforced concrete structures and products by continuous non-cast vibroforming method shall envisage the necessary degree of compaction of the concrete mixture.

12. In the production of prefabricated reinforced concrete products, the quality, corrosion protection and design position in the structure shall be ensured by the technology of reinforcement fabrication, including welded joints.

13. The requirements for the selection of concrete composition, its placement and curing regimes shall be fulfilled in the production of prefabricated reinforced concrete structures and products.

Regimes of heat treatment of precast concrete structures and products shall be appointed, based on the requirements of the normative indicators of quality, reliability and durability at reasonable energy costs.

14. In the production of prefabricated reinforced concrete structures and products, the cost of heat treatment shall be reduced via the use of chemical additives, various technological methods at the appropriate feasibility study in relation to specific conditions and production schemes.

15. Compliance with the production processes to achieve the requirements for concrete and reinforced concrete structures shall be ensured by quality control of prefabricated reinforced concrete structures and products.

16. Prefabricated reinforced concrete structures and products shall be manufactured in obedience to the environmental requirements to reduce the negative impact on the environment due to the release of large amounts of dust particles of various fractions, noise and other adverse effects.

17. Energy efficiency and rational use of natural resources shall be ensured by the parameters of the production of reinforced concrete products and structures.

Chapter 5: Performance requirements for precast concrete structures and products

Paragraph 1: Requirements for reliability

18. Failures of any nature or impairment of serviceability involving damage to human and animal life, health, property and the environment shall be excluded, with an appropriate degree of reliability, under the various design influences during construction and operation of buildings and structures, to ensure safety requirements for the production of precast concrete structures and products with initial characteristics.

19. Based on the results of calculation and design, the rated and monitored values of the characteristics of concrete to ensure the safety, serviceability and durability of structures shall be established to ensure the reliability requirements for the production of reinforced concrete structures. Crack resistance, stiffness and frost resistance shall be designated as the main standardised and controlled characteristics of reinforced concrete structures.

20. The durability requirements shall be met by the design, when the initial characteristics meet the safety and serviceability requirements for a specified long period of time, factoring in the influence on the geometric characteristics of structures and mechanical characteristics of materials of various design influences (long-term load action, adverse climatic, technological, temperature and humidity effects, alternating freezing and thawing, aggressive effects and other).

The method of corrosion protection of elements shall be properly selected to ensure the durability of prefabricated reinforced concrete structures and products.

21. Reinforced concrete structures shall be designed with sufficient reliability to prevent the occurrence of all types of limit states. This shall be achieved by the selection of material quality indicators, the dimensioning and design pursuant to the requirements of these construction standards and the relevant normative-technical documents. The technological requirements for the manufacture of prefabricated reinforced concrete structures shall be fulfilled and the requirements for ecology, energy conservation and fire protection set out in the relevant normative documents shall be complied with.

Paragraph 2: Fire safety and performance requirements

22. Fire safety of production buildings producing precast reinforced concrete structures and products shall be ensured by meeting the requirements of the Technical Regulations “General Fire Safety Requirements” approved by Order No. 439 of the

Minister of Internal Affairs of the Republic of Kazakhstan dated June 23, 2017 (registered with the Registry of State Registration of Regulatory Legal Acts under No. 15501).

23. Fire safety shall be ensured by protecting reinforced concrete structures from overheating during a fire to avoid changes in physical properties and loss of integrity, load-bearing and insulating capacity of the material.

24. Reinforced concrete structures which meet the fire resistance requirements, shall not contribute to the concealed spread of combustion. Fire resistance requirements for prefabricated reinforced concrete structures and products shall be established by the relevant regulations.

25. Fire protection of reinforced concrete structures shall be required if the thickness of the protective concrete layer does not provide the required fire resistance limit. The choice of fire protection method and material, as well as the thickness of the fire protection coating, shall be based on these design features, the operating conditions of the structure and the required fire resistance limit of the structure.

26. The choice of the fire protection method shall be made with the account taken for the required fire resistance limit of reinforced concrete structures, their type, orientation in space (columns, beams), type of load acting on the structure (static, dynamic), temperature and humidity conditions, degree of aggressiveness of the environment, increased load on structures due to fire protection, aesthetic requirements and others.

27. Adhesion of the fire retardant concrete coating with the surface of the protected structure shall prevent the propagation and development of internal cracks from the structure coating to its material (reinforced concrete).

28. The use of slab fire protection (structural method) or the application of fire retardant compositions to the surface of the concrete shall be permitted to ensure the required fire resistance limits of reinforced concrete structures.

29. Fire safety requirements, explosion safety requirements of production areas, including those related to the use of substances used for lubrication of forms, chemical additives, preparation of their aqueous solutions and concretes with chemical additives shall be observed during work in the workshops of enterprises.

30. Initial indicators of quality with the prescribed degree of reliability under the most unfavourable combinations of influences preventing the formation and/or excessive cracking, movement and/or vibrations preventing the normal operation of the building or structure (violation of health and environmental requirements, aesthetic requirements for the appearance of the structure, technological requirements for the normal operation of equipment, mechanisms, design requirements for the joint operation of the elements) shall be established to meet the performance requirements of precast concrete structures and products in their production.

31. The requirements for absence of cracks shall be imposed on reinforced concrete structures with a fully stretched cross-section to ensure impermeability (pressurised liquid or gas, exposed to radiation and others), on unique structures with increased durability requirements, and on structures operated under the influence of a highly aggressive environment.

32. Concrete and reinforced concrete structures shall ensure not only their original quality properties but also their performance during their intended service life.

33. The quality of concrete shall be ensured by appropriate selection of the concrete mix (based on the characteristics of the concrete materials and the requirements of the concrete), the concrete preparation process and the production of the concrete. Concrete properties shall be monitored during the production process and during the construction phase.

34. Safety, fitness for normal use, durability of precast concrete structures produced shall be ensured by meeting the requirements for concrete and reinforcement, structural and technological requirements.

35. Prefabricated reinforced concrete structures shall not be sources of radioactive radiation exceeding the maximum permissible values which have a negative impact on the human body and the environment.

Paragraph 3: Raw materials, warehousing and storage

36. Materials that meet the requirements of current national regulations in the field of architecture, urban planning and construction shall be used in the production of the products.

37. Portland cement, portland slag cement and their varieties shall be used as binding materials for the production of concrete in obedience to the requirements of regulatory and technical documents.

Binding materials for heat-resistant concrete shall be used in conformity with the requirements of the state regulations in the field of architecture, town planning and construction.

38. Type and brand of cement shall be selected pursuant to the purpose of structures and conditions of their operation, the required strength class of concrete, grades for frost resistance and water resistance, the value of release or transfer strength of concrete for precast structures based on the requirements of the regulatory documents with the allowance for the impact of harmful impurities in aggregates on concrete.

39. Portland clinker-based cement with a standardised mineralogical composition shall be used for concrete aimed for road and airfield pavements, chimneys and

ventilation stacks, fan and cooling towers, supports of high voltage power lines, reinforced concrete pressure and non-pressure pipes, reinforced concrete sleepers, bridge structures, pylon posts.

Portland slag cement can also be used for road base concrete.

Sulphate-resistant or other special cement can be used for concretes working in the conditions of aggressive environments.

40. Coarse and fine aggregates for heavy, stressed and fine-grained, light and heat-resistant concrete shall comply with the established requirements of regulatory documents.

41. Fly ash and ash-and-slag mixtures of thermal power plants or other additives shall be used to reduce the consumption of cement, natural and artificial aggregates in the preparation of heavy and light concrete in compliance with regulations. Fine ground additives used for heat-resistant concrete must comply with the requirements of existing regulations.

42. Portland cement, coloured cements, white cement, coarse and fine aggregates, as well as decorative crushed stone and sand shall be used for the preparation of finishing concretes and mortars.

43. Individual or complex chemical additives used to improve the properties of the concrete mixture and concrete, reduce cement consumption, labor and energy costs shall be used pursuant to their performance indicators and shall meet the requirements of regulatory and technical documents, as well as the requirements of manufacturers on specific additives.

44. Mineral additives shall not contain harmful impurities in quantities which may affect the durability of the concrete or corrode the reinforcement.

45. Cladding, thermal insulation and waterproofing finishes and products and accessories must comply with the regulations.

46. Reinforcement grids, frames, embedded and other products, bar products of the relevant grades, bar and wire reinforcement steel used for the production of reinforced concrete structures and products shall meet the requirements of relevant regulatory and technical documents.

Paragraph 4. Manufacture of reinforcement and embedded parts

47. The reinforcement elements for the different products shall be manufactured in compliance with the established technological norms, with an accuracy that meets the requirements of the regulations.

The reinforcement shall be placed in the structure in accordance with the distribution of forces, the reinforcement guidelines and the conditions for its installation in the structure.

48. The main types and structural elements of welded joints of embedded parts and reinforcement as well as the technological modes of welding shall comply with the requirements of the state regulations in the field of architecture, urban planning and construction.

49. The volumetric frames shall have rigidity sufficient for storage, transportation, compliance with the design position in the form and comply with the requirements of the normative and technical documents.

50. Damage, cuts and burning of reinforcing bars shall be avoided when stressed reinforcing bars are being produced on mechanised and automated lines.

51. Corrosion protection of welded reinforcement and embedded items shall be performed in obedience to the established requirements.

52. The anti-corrosion coating shall be applied as a continuous one, firmly adhered to the metal surface, of uniform colour, without any part of the unmelted protective metal, without cracks, delaminations (bloat), traces of local corrosion in conformity with the state standards in the field of architecture, urban planning and construction.

Paragraph 5: Preparation of concrete mixes

53. Concrete mixtures used in the production of products must comply with the requirements of regulatory and technical documents, factoring in the technological equipment operated in the plant and the specific conditions of production.

54. Concrete composition must be selected to produce concrete in structures with the strength and other quality indicators established by the current regulatory documents for these structures, with a minimum consumption of cement or other binders.

55. Depending on the purpose of reinforced concrete structures and the conditions of use, concrete shall have the required physical and mechanical properties (strength, good adhesion to the reinforcement, sufficient density) and meet the special requirements (frost resistance, heat resistance, corrosion resistance to aggressive environmental influences and others).

56. Cement, aggregates, additives used in the preparation of concrete mixtures shall be fed into concrete mixing units in conditions that ensure their quality is maintained.

57. Dosing of cement, aggregates (fractionally), water and additives shall be performed by special batchers. Accuracy of dosing materials must comply with regulatory requirements.

58. When using commercial concrete mixtures, the conditions and duration of their transportation must comply with the requirements of regulatory and technical documents.

Paragraph 6: Product forming

59. The methods of placement and vibration of the concrete mix shall ensure that the properties of the concrete in the products are uniform, with the account taken of their construction, dimensions and the position of the reinforcement and embedded parts.

60. To lubricate the forms it shall be necessary to use lubricating compositions with sufficient adhesion to the metal, not causing destruction of concrete and appearance of stains on the surface of products, as well as safe for human health and fire safety. The use of delaminated lubricants shall be excluded.

61. The reinforcement used for reinforcement of structures shall comply with the requirements of the relevant state regulations in the field of architecture, urban planning and construction. The reinforcement shall have markings, passports and certificates of conformity certifying its quality.

62. Reinforcement meshes and frameworks, embedded parts, inserts, thermal insulation materials shall be installed in the form in obedience to the requirements of the product standard documents in a certain sequence.

63. Selection of the reinforcement tensioning method for prestressed structures (mechanical, electro-thermal or electro-thermal) shall be carried out depending on the type of structures, type of reinforcement, reinforcement class and specific production conditions. The initial tension and the actual deviations of the pre-stressing of the reinforcement must not exceed the limit values.

During the tensioning of the reinforcing bars the forces must be monitored.

64. The concrete mixture must be placed and compacted in such a way that sufficient homogeneity and density of concrete in the structure can be ensured which meets the requirements of the building structure in question.

65. The volume of inter-grain voids in the compacted lightweight concrete mix must comply with the requirements of the standard technical documents.

66. Application of methods for products forming not stipulated herein, shall be allowed only after testing and approval in the prescribed manner requirements for specific products.

67. Troweling the exposed surfaces of the horizontally formed products shall be made in conformity with the requirements of the regulatory documents on these products.

68. The choice of methods of decorative facade finishing (with colored concrete, ceramic or glass tiles, decorative relief and the like) shall be made in compliance with the architectural and technical requirements for the products, established by regulatory documents and the adopted technological methods of forming (facing up or down) to ensure the required durability of finish.

69. In the case of immediate or accelerated formwork or part formwork, as well as in the case of non-compacted formwork, the forces applied to the freshly formed parts

from their weight and formwork shall be linked to the structural strength of the compacted concrete mix. The strength of the compacted mix shall be monitored by means of test forms.

70. Forming lines to ensure the specified properties of structures and products must be placed in heated production facilities.

Paragraph 7: Heat treatment of products

71. The product of the required quality with the values of strength, frost resistance, water resistance of concrete, tempering moisture of structural and thermal insulating lightweight concrete in a given time and at reasonable energy costs shall be ensured during the hardening of concrete.

72. Transition and tempering strength values of concrete must comply with the requirements of regulatory documents specified in the product standards. Breakout strength value, the conditions and terms of achieving breakout, transfer and tempering strength for each type of product shall be established pursuant to the specific conditions of production.

73. The choice of coolant shall be made on the basis of technical and economic calculations and the feasibility of its use in specific production conditions, factoring in the energy balances of enterprises.

74. Thermal units and heat transfer fluids must be selected depending on the type of process lines, product design and climatic conditions, and based on technical and economic feasibility,.

75. Special measures shall be envisaged to reduce the consumption of thermal energy and eliminate its losses when creating new and reconstructing existing units for the thermal processing of products.

76. When manufacturing prestressed structures in the power forms, plasticizing chemical additives shall be used to slow the growth of strength of concrete during the temperature rise. The rate of temperature rise in the chambers and thermoforms shall be appointed with due regard for the design of products, their mass, the specific conditions of production.

77. Temperature and duration of isothermal heating shall be established with due account for the type of concrete, the activity and efficiency of the cement in heat treatment, its heat release and mass of the products.

78. Preheating of mixtures for making stressed concrete products shall be prohibited.

79. Heat treatment of prestressed structures manufactured on stands and in power forms shall be carried out using measures to prevent cracking.

Paragraph 8: Stripping, final adjustment, storage and transport

80. After heat treatment, stripping must be carried out after the concrete has reached its stripping strength.

81. Transfer of compression to pre-stressed concrete shall be carried out only after the concrete has reached its transfer strength.

82. Ready-mixed concrete and reinforced concrete products accepted by the technical supervision of the company shall be stored and transported in compliance with the requirements of relevant regulations.

Paragraph 9. Quality control

83. Quality control of structures shall establishe compliance of technical indicators of structures (geometric dimensions, strength indicators of concrete and reinforcement, strength, cracking resistance and deformability of structures) during their manufacture, erection and operation, as well as parameters of technological modes of production to the indicators specified in the regulatory documents.

84. Quality indicators of incoming materials and products during incoming inspection shall be established on the basis of passports or certificates of conformity, as well as factory inspection tests.

85. Organization, frequency and methods of operational control shall be established in the technological documentation of the enterprise depending on the type of manufactured products and structures, as well as the adopted technology.

86. Quality acceptance inspection of finished products and their labelling shall be carried out in obedience to the requirements of the relevant normative and technical documents, and if these are not available - in conformity with the rules of acceptance, labelling, transportation and storage.

87. Devices and measuring instruments used for control and testing of finished products must comply with the requirements of the corresponding regulatory and technical documents and be verified by metrological organizations in the prescribed manner.

88. Products accepted by the technical control and delivered to the customer shall be issued a document of their quality in compliance with the requirements of the regulatory and technical documents, and in their absence - in accordance with the general technical requirements for the reinforced concrete products for construction.

89. The systematic control of the condition of batching devices and concrete mixers shall be carried out at the production site.

Chapter 6. Occupational safety, health and environmental protection requirements

90. Production processes and equipment used must comply with general safety requirements for production processes

91. All works related to the manufacture of precast concrete and reinforced concrete products shall comply with the requirements of the national regulations in the field of architecture, urban planning and construction.

92. The methods of safe loading and unloading and warehousing shall comply with the general safety requirements for loading and unloading operations.

93. The concentration of hazardous substances in the air of the working area, its temperature, humidity and speed shall not exceed the established sanitary and epidemiological normative documents.

94. Noise and vibration levels in the workplace must not exceed permissible standards pursuant to sanitary and epidemiological regulation documents.

Special measures must be taken to eliminate the harmful effects of vibration on workers.

95. Natural and artificial lighting in production and auxiliary shops, as well as on the territory of the enterprise shall comply with the requirements of sanitary and epidemiological regulation documents.

96. The environmental protection measures for the production of prefabricated reinforced concrete structures and products shall ensure the reduction of the negative impact on the environment by reducing dust and gas emissions, discharges of substances and other impacts.

97. An aspiration system shall be envisaged to reduce the release into the atmosphere of a large number of dust particles of various fractions in the production of precast concrete structures in the production shops.

98. Wastewater treatment shall be organised at precast concrete plants to reduce soil and groundwater pollution.

99. The company shall implement measures for the disposal of production waste and defective products. Removal and disposal of unrecycled waste and defective products shall be carried out in obedience to the requirements of relevant regulations.

Chapter 7: Energy saving and natural resource management

100. The production of prefabricated reinforced concrete structures and products must comply with the optimum technical and economic indicators for energy and resource conservation.

101. When organizing the production of prefabricated reinforced concrete structures and products, the introduction of resource-saving, low-waste and waste-free technologies must be provided for the rational use of natural resources.

102. Recycling, including the collection and processing of waste, the creation of a closed water supply system must be ensured in the production of prefabricated reinforced concrete structures and products.

103. Production of reinforced concrete structures and products shall contribute to the reduction of consumption of cement, metal and natural materials.

104. Effective forming methods, including shutterless vibroforming must be applied to reduce the consumption of reinforcement, increase energy efficiency in the production of prefabricated reinforced concrete products and structures.