

Code for Design of Civil Buildings

民用建筑设计通则

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Code for Design of Civil Buildings
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NOTICE

This code is written in Chinese and English. The Chinese text shall be taken as the ruling one in the event of any inconsistency between the Chinese text and the English text.

**Notice of Promulgation for Ministry of Construction of the
People's Republic of China**

No. 327

**Notice on Promulgation of the national standard “Code for
Design of Civil Buildings” by the Ministry of Construction of
the People’s Republic of China**

Hence the new Standard “Code for Design of Civil Buildings” has been approved as a national standard with a serial number of GB 50352-2005, which shall come into force upon July 1st, 2005. Herein, Clauses (Items) 4.2.1, 6.6.3 (1, 4), 6.7.2, 6.7.9, 6.12.5, 6.14.1 are mandatory clauses, which must be forced strictly. At the same time, the former “Code for Design of Civil Buildings” JGJ 37-87 is superseded.

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Ministry of Construction of the People’s Republic of China

May 9th, 2005

Preface

This Standard is revised of the “Code for Design of Civil Buildings” JGJ 37-87 on the basis of the requirements in Document JB [2001] No.87 of the Ministry of Construction. This Code was revised by the revision team after the wide investigation and research, careful summarization of the experiences, on the reference of the relative international standards and advanced codes in abroad, and on the basis of widely asked for the opinions.

The main technical contents of this code are: 1. General rule; 2. Terms; 3. Basic Requirements; 4. Limits of the urban planning to the buildings; 5. Design of sites; 6. Design of buildings; 7. Indoor environments; 8. Facilities of buildings.

The main revised technical contents are: The design rule, designed service time, the basic requirements of the climate sub area to the buildings, the outshoot of the building, architectural composition, indoor environments; the terms, floor plan layout, architectural curtain wall, indoor and outdoor decoration, and facilities of the buildings are added in this Code.

The clauses indicated in the bold face are mandatory clauses, which must be forced strictly.

The Ministry of Construction is in charge of management and explanation of the mandatory clauses in the standard, the China Institute of Building Standard Design & Research is responsible for the explanation of the specific technical contents.

Those who use the Standard are kindly requested to pay attention to combining their engineering practice, summarizing their experience of the use of this Standard, collecting information, and mail relevant suggestions and comments in a timely manner to: China Institute of Building Standard Design & Research (19, Che Gong Zhuang Da Jie Street, Outside of Xizhimen, Beijing Urban, China, Post Code: 100044) for references of the later revision of this Code.

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Contents

1	General	1
2	Terms.....	2
3	Basic Requirements	5
3.1	Classification of civil buildings	5
3.2	Designed life time	5
3.3	General requirements of the climate sub area of the building to the building	5
3.4	Relation of building and environment	7
3.5	Accessibility facilities of the building	8
3.6	Parking space	8
3.7	Building that has no calibrated number of people	8
4	Limits of the urban planning to the building	9
4.1	Construction site	9
4.2	Architectural outshoot.....	10
4.3	Control of the building height.....	11
4.4	Building density, plot ratio and greening ratio.....	12
5	Design of site	13
5.1	Layout of the buildings	13
5.2	Roads.....	14
5.3	Vertical	14
5.4	Greening.....	15
5.5	Layout of the project pipelines.....	16
6	Design of buildings	17
6.1	Floor plan layout.....	17
6.2	Story height and indoor net height.....	17
6.3	Basement and semi-basement.....	17
6.4	Mechanical floor, refuge storey and open floor	18
6.5	W.C., Washing room and bathing room	19
6.6	Step, Ramp and Railing	20
6.7	Staircase	21
6.8	Elevator, Escalator and Moving Walkway	22

6.9	Wall Body and Deformation Joint.....	23
6.10	Door and Window.....	24
6.11	Building Curtain Wall.....	25
6.12	Flooring.....	25
6.13	Roof and Suspended Ceiling.....	26
6.14	Pipe Shaft, Smoke Flue, Air Relief Shaft and Garbage Shaft.....	28
6.15	Indoor and Outdoor Decoration.....	29
7	Indoor Environment.....	30
7.1	Daylighting.....	30
7.2	Ventilation.....	31
7.3	Heat Preservation.....	32
7.4	Heat Prevention.....	32
7.5	Sound Insulation.....	33
8	Building Equipments.....	35
8.1	Water Supply and Drainage.....	35
8.2	Heating, Ventilation and Air Conditioning.....	36
8.3	Building Electricity.....	37
Appendix A	Building Climate Zoning Plan.....	41
	Terminology Explanation for This Code.....	42

1 General

1.0.1 To make the civil buildings meet the basic requirements of fitting, economic, safety, sanitation, environmental protection and so on, this Code was made to be the general rule that must be obeyed in the design of all kinds of civil buildings.

1.0.2 This Code is fit for the design of civil buildings of newly built, rebuilt and expanded built.

1.0.3 The design of civil buildings shall not only carry out the relative national laws and codes in the engineering construction, but also meet the following requirements:

1 Shall correctly treat the relative relationship of people, building and environment according to the rule of the stratagem of continual developments;

2 Must protect the ecology environment, prevent the pollution and destroy the environment;

3 Shall meet the needs of the people's matter and spirit according to the basis of people;

4 Shall carry out the basic national policies of saving fields, saving resources, saving water, and saving raw material;

5 Shall meet the requirements of the local urban planning, and be accordance with the surrounding environment;

6 The building and environment shall adopt synthetically the disaster prevention and safety measurements of fire protection, anti-seismic, flood protection, aerial defense, anti-wind and anti-snow, anti- lightning strike and so on;

7 To be convenient for the usage of handicapped people, old people and so on, the accessibility facilities shall be provided in the indoor and outdoor environments;

8 All kinds of constructions in the areas of all grades of historical culture famous cities, historical culture protection zones, culture protection units, and famous scenic sites that issued by the nation and local districts, shall be done according to the protection planning and relative bylaws established by nation and the local district.

1.0.4 The design of civil buildings shall not only meet this code, but also meet the specifications in the relative current national standards and codes.

2 Terms

2.0.1 Civil building

Total of the buildings to provide the inhabitation of people and carry out the public activities.

2.0.2 Residential building

Buildings to provide the inhabitation usage of people.

2.0.3 Public building

Buildings to provide the people carrying out all kinds of public activities.

2.0.4 Accessibility facilities

Safety facilities to be convenience for the usage of the people that falls about or has the eyesight obstacle like the handicapped people or old people.

2.0.5 Parking space

Indoor, outdoor spaces for parking the automotive vehicles and non-automotive vehicles.

2.0.6 Construction site

The usage site of the construction project that is determined according to the characteristic of field and right of usage.

2.0.7 Boundary line of roads

Boundary line of the usage site of the planned urban roads (including the district-grade roads in the residential area).

2.0.8 Boundary line of land; property line

Boundary line in the range of the usage right in the land of all kinds of construction projects.

2.0.9 Building line

Boundary line that the position of the foundation bottom of the buildings and structures shall not be exceeded which is determined by the relative code or detail planning.

2.0.10 Building density; building coverage ratio

The ratio of the total area of foundation bottom of the building and the field contained area in a specific range (%).

2.0.11 Plot ratio, floor area ratio

The ratio of the total architectural area and the field contained area in a specific range (%).

2.0.12 Greening rate

The ratio of the total area all kinds of greening lands occupied in the total area of the district in a specific district (%).

2.0.13 Insolation standards

The sunlight time obtained by the architectural window calculated from the windowsill surface on the bottom layer in the range of effective sunlight time in the specified sunlight standard day (Middle Winter Day or Severe Cold Day), which is determined by the climate zone that the building is, the size of the city and the usage characteristic of the building.

2.0.14 Storey height

The vertical distance that is calculated between the floor surfaces, ground surface s(completed surface) in all the stories of the building, in the top storey, it is the vertical distance from the floor surface (completed surface to the point of intersection between the structural surface of the flat roof surface or the pitched roof surface, and the extended line of the external wall tegmen.

2.0.15 Interior net storey height

The vertical distance of the effective usage space from the floor (ground) surface (completed surface) to the suspended ceiling or between the bottom surfaces of the floor or roof surface.

2.0.16 Basement

The basement is the room that the height in which the ground level of the room is lower than the ground level in outdoor exceeds 1/2 of the net height of the room.

2.0.17 Semi-basement

The semi-basement is the room that the height in which the ground level of the room is lower than the ground level in outdoor exceeds 1/3 but not exceeds 1/2 of the net height of the room.

2.0.18 Mechanical floor

The space layer in the building that is specially set for the facilities and pipelines of heating, ventilation, air conditioning, water supply, drainage, distribution and transformation of electricity and so on, and for the operation of the people who comes into it.

2.0.19 Refuge storey

For the high-rise building that is higher than 100 m, it is the floor layer that is provided for the evacuation and refuge of the people specially set for the fire safety.

2.0.20 Open floor

The open floor layer that has only the structural supporting but has no building enclosures.

2.0.21 Step

The step for the walking of the people that is set in the indoor or outdoor ground level or in different levels in the floor layer.

2.0.22 Ramp

The slope type traffic road that connects floor surface or ground surface with different levels for the walking of people or moving of vehicles.

2.0.23 Railing

The protection separation components which height is between the bosom and abdomen of the people to protect the people's safety or use for the separation of space.

2.0.24 Stair

The architectural component used for the vertical traffic between the floor layers which is composed by the rundles for continual walking, rest platform, railings (or banisters) for safety, armrests and the relative supporting structures.

2.0.25 Deformation joint

The conformation joint that is obligated for the crack, impact, or even damage of the building because of the attached deformations and stresses produced in the structure under the outside factors to the building, including expansion joint, settlement joint and aseismatic joint.

2.0.26 Building curtain wall

The building external enclosure structure that is composed of steel trusses and panels and doesn't bear the main structure's loads and actions.

2.0.27 Suspended ceiling

The ceiling that is suspended under the roof of the building or the floor structure.

2.0.28 Pipe shaft

The vertical hoist-way in the building for the setting of vertical facility pipelines.

2.0.29 Smoke uptake; smoke flue

The shaft for discharging all kinds of smokes.

2.0.30 Air relief shaft

The shaft for discharging the indoor steam, humidity or contaminated air, and transforming fresh air.

2.0.31 Decoration; finishing

The detail process and artificial treatment of the inside, outside space of the building relying on the, main structure of the building.

2.0.32 Daylighting

Technology of the natural light illumination obtained in the internal using space of the building meeting the requirements of usage, safety, comfort, being beautiful to look at and so on, to ensure that the living, working or producing activities of the people have proper light environment.

2.0.33 Daylight factor

The ratio of the illumination that produces from the diffused sky radiation directly or indirectly accepting from the assumed or known sky brightness distribution and the one produced on the horizontal surface without shelter in outdoor in the hemisphere of this sky at the same time.

2.0.34 Standard value of daylight factor

Daylight factor value in the indoor and outdoor natural light illumination limit.

2.0.35 Ventilation

The technology that makes the air quality meeting the requirements of sanitation, safety, comfort and so on using natural or mechanical methods to change the air in the internal usage space of the building, to ensure that the living, working or producing activities of the people has proper air environment.

2.0.36 Noise

The external disturbing sound that influences the normal living, working, studying, rest and even damages the health of people.

3 Basic Requirements

3.1 Classification of civil buildings

3.1.1 The civil buildings can be divided into residential building and public building according to the usage function.

3.1.2 The classification of the civil buildings according to the over-ground layers or height shall meet the following specifications:

1 The residential buildings can be divided according to layers: the low-layer residential building when the layer is 1 to 3, the multi-storey residential building when the layer is 4 to 6, middle-storey or high-rise residential building when the layer is 7 to 9, the high-rise residential building when the layer is 10 or more than 10;

2 When the height of the civil building except the residential building is not more than 24 m, it is the single-storey and multi-storey building, when it is higher than 24 m, it is the high-rise building (not including the single-storey public building that the height of the building is larger than 24 m);

3 The height of the civil building is larger than 100 m, it is super high-rise building.

Note: The layers and height calculation of the building in this clause shall meet the relative specifications in the fire-protection code.

3.1.3 The grade sort classification of the civil buildings shall meet the relative standards or the specifications in the trade competent authorities.

3.2 Designed life time

3.2.1 The designed life time of the civil building shall meet the specifications in table 3.2.1.

Table 3.2.1 Classification of the designed life time

Sort	Designed life time (year)	Example
1	5	Temporary buildings
2	25	Buildings that are easy to change the structural components
3	50	Normal buildings and structures
4	100	Memorialization buildings and specially important buildings

3.3 General requirements of the climate sub area of the building to the building

3.3.1 The general requirements of the climate sub area of the building to the building shall meet the specifications in table 3.3.1. The regionalization map of the buildings in China sees in Appendix A.

Table 3.3.1 General requirements of different sub area to the building

Name of sub area		Name of pyrology sub area	Main indexes of the climate	General requirements of the building
I	I A	Severe cold region	Average air temperature in January $\leq -10^{\circ}\text{C}$ Average air temperature in July $\leq 25^{\circ}\text{C}$ Average comparative humidity in July $\geq 50\%$	1. Building must meet the requirements of heat protection, winter proofing, frost protection, etc in winter 2. In I A, I B region, shall prevent the damage to the building of the frozen earth, snow cover 3. In the west region of I B, I C, I D, the building shall prevent hail, sandy wind
	I B			
	I C			
	I D			
II	II A	Cold region	Average air temperature in January $-10\sim 0^{\circ}\text{C}$ Average air temperature in July $18\sim 28^{\circ}\text{C}$	1. Buildings shall meet the requirements of heat protection, winter proofing, frost protection, etc in winter, in part regions shall also consider heat protection 2. In II A region, buildings shall have heat, humidity, rainstorm protections, in seaside regions, shall prevent the salt fog corrosion
	II B			
III	III A	Region that is hot in summer, cold in winter	Average air temperature in January $0\sim 10^{\circ}\text{C}$ Average air temperature in July $25\sim 30^{\circ}\text{C}$	1. Buildings must meet the requirements of heat protection, sunshade, aeration and cool down in summer, shall also consider cold protection in winter 2. Buildings shall have rain, humidity, flood, thunder protections 3. In III A region, shall have typhoon, rainstorm protection and salt fog corrosion
	III B			
	III C			
IV	IV A	Region that is hot in summer, warm in winter	Average air temperature in January $>10^{\circ}\text{C}$ Average air temperature in July $25\sim 29^{\circ}\text{C}$	1. Buildings must meet the requirements of heat protection, sunshade, aeration, rain protection in summer 2. Buildings shall have rainstorm, humidity, flood, thunder protections 3. In IV A region, shall have typhoon, rainstorm protection and salt fog corrosion
	IV B			
V	V A	Friendly region	Average air temperature in July $18\sim 25^{\circ}\text{C}$ Average air temperature in January $0\sim 13^{\circ}\text{C}$	1. Buildings must meet the requirements of rain protection and aeration 2. In V A region, shall have cold protection, in VB region, shall especially have thunder protection
	V B			
Name of sub area	Main indexes of the climate	General requirements of the building	Name of sub area	

VI	VI A VI B	Severe cold region	Average air temperature in July <18 °C Average air temperature in January 0~-22 °C	1. Pyrology shall meet the relative requirements in severe cold and cold regions 2. In VI A, VI B regions, shall prevent the influence of frozen earth to the Subgrade and underground pipeline of building, and shall especially have sandy wind protection 3. In east region of VI C, building shall have thunder protection
	VI C	Cold region		
VII	VII A VII B VII C	Severe cold region	Average air temperature in July ≥18 °C Average air temperature in January -5~-20 °C Average comparative humidity in July <50%	1. pyrology shall meet the relative requirements in severe cold and cold regions 2. Except in VII D regions, shall prevent the damage of frozen earth to the Subgrade and underground pipeline of building 3. In VII B region, shall especially note the damage of snow cover 4. In VII C region, building shall especially have the protection of sandy wind, also have heat protection in summer 5 In VII D region, building shall have heat protection in summer, in Tulufan Basin, shall especially note the heat isolation, cooling down
	VII D	Cold region		

3.4 Relation of building and environment

3.4.1 The relation of building and environment shall meet the following requirements:

- 1 The construction site shall select in the safe region without dangers of geologic hazard or flooding and so on;
- 2 The overall layout of the building shall combine the local natural and geography environment characteristic, and shall not destroy the natural ecology environment;
- 3 The surround of the building shall have the sanitation conditions of obtaining sunlight, natural daylight, natural aerion and so on;
- 4 The air, soil, water body in the surrounding of the building shall not have harm to people, to ensure the sanitation and safe environment;
- 5 The castoff like garbage, exhaust gas, wastewater and so on that are produced during the usage of the building shall be treated, and control the noise, glare and so on, shall not bring public harm;
- 6 The overall shape and color treatment of the building shall be accordance with the surrounding environment;
- 7 The construction site shall make the design of virescence, beautification of environment, and consummate the outdoor environmental facilities.

3.5 Accessibility facilities of the building

3.5.1 The accessibility facilities shall be set on roads in the residential region, public greening, and public service facilities, and they shall be connected with the one on urban roads.

3.5.2 The accessibility facilities shall be set in the public traffic parts in the civil building that set elevators.

3.5.3 The accessibility facilities shall be set in the buildings that are especially for the handicapped and old peoples.

3.5.4 The setting range and design requirements of the accessibility facilities in the residential regions and civil buildings shall meet the specifications in the current national standard “Code for design of accessibility facilities in urban roads and buildings” JGJ 50.

3.6 Parking space

3.6.1 Parking lot (garage) shall be nearly set in the newly built, expanded built residential regions or the parking garage is built attached in the residential building. The number of parking place of motor vehicles and non-motor vehicles shall meet the relative code and the specifications of the local urban planning administration competent authorities.

3.6.2 In the public buildings of newly built and expanded built, the parking places of motor vehicles and non-motor vehicles shall be set in the building, or in the same site, or in the parking lot (garage) that was constructed and planned as a whole, according to the architectural area or using people, and under the specifications of the local urban planning administration competent authorities.

3.6.3 The noise or exhaust gas that are produced by the parking lot (garage) of motor vehicles shall be treated, and not influence the surrounding environment, its design shall meet the specifications in the relative codes.

3.7 Building that has no calibrated number of people

3.7.1 Except in the buildings that there are markings of using number of people like fixed seats, for the building that has no calibrated number of people the using number of people shall be determined according to the relative design code or after the investigation and analysis, the width of the safety exits shall be calculated according to the using number of people as the site number.

3.7.2 In the public building like multi-functions, all kinds of places that might be opened at the same time and use the same exit, the width of the safety evacuation exit is calculated in the horizontal direction according to the sum of the using number of people in all the parts, the one in the vertical direction shall be calculated according to the maximum number of people in all the layers.

4 Limits of the urban planning to the building

4.1 Construction site

4.1.1 The using characteristic of the building in the site shall meet the one that is determined by the urban planning.

4.1.2 The site shall adjoin with the boundary line of roads, else there shall be site roads connecting with the urban roads that are defined by the boundary line of the roads. When the architectural area in the site is smaller than or equal to 3000 m², the width of the site road shall not be smaller than 4 m, when the architectural area in the site is larger than 3000 m², and there is only one site road connecting with the urban road, the width of the site road shall not be smaller than 7 m, if there are two roads connecting with the urban roads, the width of the site road shall not be smaller than 4 m.

4.1.3 The altitude of the site ground shall meet the following specifications:

1 The altitude of the site ground shall be designed according to the control elevation that is determined by the urban planning;

2 The altitude of the site ground shall be accordance with the elevation of the adjacent site, and shall not obstruct the drainage of all the adjacent sides;

3 The altitude of the site ground in the lowest place shall better be higher than the lowest altitude of the adjacent urban road; else there shall be measures to discharge the surface water.

4.1.4 The relation of the adjacent bases shall meet the following specifications:

1 There shall be clear spaces and roads between the buildings and the adjacent bases that are set according to the requirements of architectural fire protection and so on. When there are clear spaces or roads before or in the backside of the building, and they meet the relative specifications of fire protection codes, the buildings in the two sides of the boundaries of the adjacent bases can be adjoined constructed;

2 The buildings and structures in the site shall not influence the insolation standard and daylight standard of the buildings in this site or in the other field;

3 Except the permanent clear space that is determined by the urban planning, the building that is cling to the site and is constructed in the boundary lines must not set openings, doors, windows that open horizontally outsides, balconies, creasing, outdoor air conditioning machines, discharge opening of the waste water and drainage of rainwater to the direction towards the adjacent site.

4.1.5 The place of the passageway of the motor vehicles in the site shall meet the following specifications:

1 The distance to the crossing of the main roads in the large-scale or middle-scale cities, there shall not be less than 70 m measuring from the crossing of the boundary line of the road;

2 There shall not be less than 5 m from the most edge line of crosswalk line, over bridge, pedestrian underpass (including approach, bridge approach);

3 There shall not be less than 15 m for the distance to the entrance of subway, station of public traffic;

4 There shall not be less than 20 m for the distance to parks, schools, buildings for children and handicapped;

5 When the slope degree of the site road is larger than 8%, there shall be amortization section connecting with the urban road;

6 The distance to the graded crossing or other special circumstances shall meet the specifications of local urban planning administration competent authorities.

4.1.6 The site that has buildings with congestion people like large-scale or super-large-scale entertainments, commercial services, sports, traffics and so on shall meet the following specifications:

1 There shall at least one side in the site that directly adjoining the urban road, this urban road shall have enough width to decrease the influence of the people evacuation to the normal urban traffic;

2 The length of the site along the urban road shall be determined by the scale of the building or the number of the evacuation people, and shall at least not be less than 1/6 of the perimeter of the site;

3 There shall at least two or more than two directions leading to the exit of the urban road (including the connected site road);

4 Main passageways of the site or building must not be directly connected with the express way, and must not directly towards the crossing of the main roads of the city;

5 There shall be clear space for staple of the people before the main passageways of the building, its area and dimensions of length and width shall be determined by the usage characteristic and number of people;

6 The layout of greening and parking lots shall not influence the usage of the staple space, and shall better not set barriers like enclosure or gateway and so on.

4.2 Architectural outshoot

4.2.1 The buildings and the attached facilities must not be constructed which extrude the boundary line of roads and filed, the architectural outshoot that can not extrude are:

——Underground building and attached facilities, including structural retaining pile, retaining wall, basement, bottom plate and its foundation of basement, cesspool and so on;

——Up-ground building and attached facilities, including porch, corridor, balcony, outdoor stair, step, ramp, flower pool, enclosure, platform, apron open sewer, air inlet and outlet of basement, passageway of basement, inlet well, light well and so on;

——Other facilities except connecting the city's municipal public facilities like pipelines, tunnels, over bridges and so on in the site.

4.2.2 The architectural outshoot that is allowed to extrude the boundary line of road after the approval of the local urban planning administration competent authorities shall meet the following specifications:

1 In the top space of the road surface that has pave way:

1) The outshoot building components that is allowed to extrude above 2.50 m: bay window, window sash, window cover, place for air conditioning machine, the extruding depth shall not be larger than 0.50 m;

2) The movable sunshade is allowed to extrude above 2.50 m, the extruding width shall not be larger than the width of the pave way minus 1 m, at the same time it shall not be larger than 3 m;

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3) Rain cover and creasing is allowed to extrude above 3 m, the extruding depth shall not be larger than 2 m;

4) Rain cover and creasing is allowed to extrude above 5 m, the extruding depth shall better not be larger than 3m.

2 Above the road surface that has no pave way: the outshoot architecture components is allowed above 4 m: window cover, place for air conditioning machine, the extruding depth shall not be larger than 0.50 m.

3 The architectural outshoot shall have fixed combination with the building itself.

4 The building and the architectural outshoot must not discharge directly the rainwater, air conditioning condensation water and waste water that discharged from other facilities towards the road.

4.2.3 When the local urban planning administration competent authorities define the architectural control line in the boundary line of the field, the foundation bottom of the building shall not exceed the architectural control line, the architectural outshoot and attached facilities that extrude the architectural control line shall meet the requirements of the local urban planning.

4.2.4 The building or structures that is belong to meet the need of commonweal and does not influence the traffic and fire control, including the public facilities like public telephone box, waiting room of public traffic, peace station and so on, and temporary building, structures, they can be constructed extruding the boundary line of road after the approval of the local urban planning administration competent authorities.

4.2.5 The construction of the riding building, arcade, and the suspended building along the boundary line of road shall not influence the safety of traffic and fire control; The facilities like the directly exhausting air conditioning machine, discharge fan and so on or the ventilation system that discharges harmful gas shall not be set in the public space that has roof.

4.3 Control of the building height

4.3.1 The height of building shall not be harmful to the public safety, sanitation and sightseeing, the height of the building in the following regions shall be controlled:

1 In the region that has special requirements for the architectural height, it shall be controlled according to the urban planning requirements;

2 For the building along the urban road, the height of the podium building and main tower of the building shall be controlled according to the width of the road;

3 For the building that is near the airport, broadcasting station, telecom, microwave communication, observatory, satellite ground station, military stronghold projects ad so on, when it is in the range of some kind of technical job control district, the height of the building shall be controlled according to the net height requirements;

4 When the building is in the protection planning region that is defined in section 8 in item 1.0.3 in Chapter 1 in this code.

Note: The control of the height of the building shall also meet the specifications in the local urban planning administration competent authorities and relative specialized departments.

4.3.2 The calculation of the control of architectural height shall meet the following specifications:

1 The architectural height in the control region in section 3, 4 in item 4.3.1: shall be

calculated according to the height from the outdoor ground surface of the building to the highest point of the building or structure;

2 The architectural height that is not in the control region in section 3,4 in item 4.3.1: for the flat roof, it shall be calculated according to the height from the outdoor ground surface of the building to the top point of the topping layer of the roof or the parapet wall; for the pitched roof, it shall be calculated as the average height from the outdoor ground surface of the building to the eave and ridge of the roof; the following outshoot can not be calculated in the architectural height:

1) The attached rooms that locally extrude outside the roof like the stair room, elevator machine room, water tank room and so on, occupying the surface area of the roof does not exceed 1/4;

2) The air relief shaft, chimney, decoration components, flower support, communication facilities and so on, that extrude outside the roof

3) Facilities like air conditioning cooling tower.

4.4 Building density, plot ratio and greening ratio

4.4.1 The architectural design shall meet the requirements of the building density, plot ratio and greening ratio that are controlled by the legal planning.

4.4.2 When the construction unit provide permanent architectural open space for the city and use for the public people unconditionally in the architectural design, the established building density and plot ratio of this filed can be increased properly, and shall meet the relative specifications in the local urban planning administration competent authorities.

5 Design of site

5.1 Layout of the buildings

5.1.1 The civil buildings shall do the all-around design of site for the layout of the buildings, roads, vertical one, greening and engineering pipeline and so on, according to the condition of the urban planning and requirements of tasks, on the basis of the rule for the relation between buildings and environment.

5.1.2 The layout of the buildings shall meet the following specifications:

- 1 The building space shall meet the requirements in the code for fire control;
- 2 The building space shall meet the requirement of the natural daylight of the building rooms (Daylight in the section 7.1 in Chapter 7), and shall avoid the disturbance of sight line;
- 3 The buildings that have insolation requirement shall meet the requirement of insolation standard of the building in item 5.1.3 in this section, and shall execute the relative specifications about building space that was established by the local urban planning administration competent authorities;
- 4 For the natural disaster region that has earthquakes, the layout of the buildings shall meet the specification of the relative safety standards;
- 5 The layout of the buildings shall make the people flow, vehicle flow and goods flow in the site of the buildings separate reasonably, avoid the disturbance, and be advantage for the fire control, parking and staple of people;
- 6 The layout of the building shall prevent and resist the attack of the disaster like cold, summer hot, fast wind, rainstorm, snow cover, small sand and so on according to the region climate characteristic, and shall utilize the natural air flow , organize the ventilation, and prevent the produce of bad small climate;
- 7 According to the position, direction and strength of the noise source, the all-around measures in the building functional sub area, layout of roads, exposing direction, distance, landform, greening, barrier function of the building and so on shall be adopted, to prevent or decrease the environmental noise;
- 8 The sanitation distance for the building and all kinds of pollution sources shall meet the specifications in the relative sanitation standards.

5.1.3 The building insolation standard shall meet the following requirements:

- 1 In each set of residential building there shall be one residential room that can obtain sunlight, its sunlight standard shall meet the relative specifications in the current national standard “Code for planning and design of urban residential region” GB 50180;
- 2 In the dormitory, more than half of the rooms shall obtain the insolation standard that is equal to the same residential room in the building;
- 3 Main living rooms in baby farms and kindergartens shall obtain the insolation standard to be confirmed not less than 3 h in the midwinter day;
- 4 For the residential building for the old people, the bedrooms, living rooms of the residential building for the handicapped, more than half sick rooms and recuperation rooms in hospitals, and sanatoriums, more than half classrooms, they shall obtain the insolation standard of not less than 2 hours in the Middle Winter Day.

5.2 Roads

5.2.1 Roads in the construction site shall meet the following specifications:

1 Roads in the site shall be set to connect with the urban roads, the road surface for motor vehicles in the connecting place shall set facilities to limit the speed of the vehicle, the road shall be able to reach the safety exit of the building;

2 The pave way to connect the streets and the inner yard shall be set outside the building along the street (can use the stair room), its space shall better not be larger than 80 m;

3 When the road changes direction, the greening beside the road and the building shall not influence the effective sight distance of driving vehicle;

4 When there is underground parking lots in the site, at the passageway of vehicles there shall be effective displaying symbols; the setting height if the symbol shall not influence the traffic for people and vehicles;

5 When the vehicle flow rate in the site is relatively big, the pave way shall be set.

5.2.2 The road width in the construction site shall meet the following specifications:

1 For one-way road, the width shall not be less than 4 m, for double-way road, the width shall not be less than 7 m;

2 For the pave way, the width shall not be less than 1.50 m;

3 When utilizing the road side for parking, it shall not influence the effective traffic width;

4 When the road changes direction, it shall meet the requirement of the minimum turning radius of the vehicles; the road for fire engine shall be set according to the minimum turning radius of the fire engine.

5.2.3 The space between the road and the building shall meet the following specifications:

1 When there is outdoor hydrant in the site, the space between the road for vehicles and the building shall meet the relative specifications in the code for fire proofing;

2 The minimum distance from the edge of road in the site to the building or structure shall meet the relative specifications in the current national standard “ Code for planning design of urban residential district” GB 50180;

3 There shall better not set overhead road for vehicles in the site, when the overhead road for people is set paralleling with the building, there shall have the sight distance to protect privacy and the requirement to prevent noise.

5.2.4 The setting of the passageway for the underground garage in the construction site shall meet the following specifications:

1 The distance from the passageway for the underground garage to the crossway of the site road or the slope starting point of the overhead road shall not be less than 7.50 m;

2 When the passageway of the garage is perpendicular to the road, the passageway shall keep the safety distance of not less than 7.50 m with the boundary line of the road;

3 When the passageway of the garage is parallel to the road, there shall be the amortizing roadway that is not less than 7.50 m to converge into the site road.

5.3 Vertical

5.3.1 The ground surface of the construction site and the slope degree of the road shall meet the following specifications:

1 The slope degree of site ground surface shall not be less than 0.2%, when the slope degree of it is larger than 8%, it shall better be divided into mesas, there shall be retaining wall or retaining slope in the connection place;

2 The longitudinal slope of the roadway in the site shall not be less than 0.2 %, and shall not be larger than 8%, its length of slope shall not be larger than 200 m, in some specific roads, it can be not larger than 11 %, its length of slope shall not be larger than 80 m; in severe cold district that has lots of snow, it shall not be larger than 5 %, its length of slope shall not be larger than 600 m; for the transversal slope it shall be 1%~2%;

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3 The longitudinal slope of the non-roadway in the site shall not be less than 0.2 %, and shall not be larger than 3%, its length of slope shall not be larger than 50 m, in severe cold district that has lots of snow, it shall not be larger than 2 %, its length of slope shall not be larger than 100 m; for the transversal slope it shall be 1%~2%;

4 The longitudinal slope of the pave-way in the site shall not be less than 0.2 %, and shall not be larger than 8%, in severe cold district that has lots of snow, it shall not be larger than 4 %, for the transversal slope it shall be 1%~2%;

5 There shall set accessibility pave-way in the main section for the people's activity in the site.

Note: The vertical design in hilly country and hills district shall also meet the specifications in the relative code.

5.3.2 The drainage of the ground surface in the construction site shall meet the following specifications:

1 There shall have measures to discharge the rainwater of the ground surface and road surface to the urban drainage system, the drainage method shall be determined by the urban planning, there shall have recycling and re-utilizing measures for the rainwater in the districts that have conditions;

2 When using the roadways to discharge the rainwater of the ground surface, the type and number of the gully shall be determined by the area of the water converge, flowing amount, longitudinal slope of the road and so on;

3 In the road that has one side for discharging water and the section that is low-lying and easy to accumulate water, the measure that does not influence the traffic and cleaning of the road surface when discharging the water shall be adopted.

5.3.3 At the passageway of the ground floor of the building, there shall have measures to prevent the circumfluence of the outdoor rainwater on the ground.

5.4 Greening

5.4.1 The construction project shall include the greening project; its design shall meet the following requirements:

1 Shall better adopt the all-around greening including vertical greening and roof greening and so on; the index of the greenbelt area shall meet the specifications in the relative code or in the local urban planning administration competent authorities;

2 The configure and layout methods of the greening shall be determined by according to the city climate, soil, environment function and so on;

3 The distance from the greening to the building, structure, road and pipeline shall meet the

specifications in the relative code;

4 Shall protect the natural ecology environment, and shall adopt measures to protect old and famous trees;

5 Shall prevent the wrapping of the root system on the trees the underground pipelines and destroy to the water proof layer of the underground building.

5.5 Layout of the project pipelines

5.5.1 The project pipelines shall better be laid under the ground; the project pipelines laying overhead above the ground and the facilities setting on the ground of the project pipelines must meet the requirement of the traffic for vehicles, and must not disturb the normal activities for normal people and vehicles, and shall prevent the disadvantage influences to the building and sights.

5.5.2 For the project pipeline that connects with the urban pipe network, its plan position and vertical elevation shall adopt the uniform coordination system and altitude system in the city.

5.5.3 The laying of the project pipeline shall not influence the safety of the building, and shall prevent the damage because of the corrosion, sunken, vibration, loads and so on.

5.5.4 The project pipeline shall be synthetic laid according to different characteristics and requirements. For the project pipelines that have influences to the safety, sanitation, anti-disturbance and so on, they shall not share ditches and be laid nearby. The project pipeline that utilizing the synthetic pipe tunnel shall be laid in different ditch (room) in the synthetic pipe tunnel.

5.5.5 The strike of the underground project pipelines shall better be parallel or perpendicular to the road or the main body of the building. The project pipeline shall be laid from shallowly near building to deeply near road. The layout of the project pipeline shall be short and convenience, decreasing turnings. Between the pipelines, pipeline and the road the crossing shall be decreased.

5.5.6 The project pipelines that are parallel to the road shall better not be laid under the roadway, when there is need to do so, the project pipeline that has relative big buried depth and fewer overhauls can be laid under the roadway.

5.5.7 The horizontal and vertical net space and buried depth between the project pipelines, the horizontal net space between the project pipeline and the building, structure, virescence trees shall meet the specifications in the relative codes.

5.5.8 The outdoor project pipelines in the seismic zone of more than grade 7, permafrost district, severe cold district, collapsed loess district and expansive soil district shall meet the specifications in the relative codes.

5.5.9 The well cover of the inspection well of the project pipeline shall better have locking equipment.

6 Design of buildings

6.1 Floor plan layout

6.1.1 The floor plan layout shall be reasonably arranged according to the usage characteristic, function, and technology requirements of the building.

6.1.2 The locating coordination dimensions like the column net, width of rooms and so on of the floor plan layout shall meet the specifications in the relative standards in the current national standard “Uniform Standard for Architectural modular coordination” GBJ 2.

6.1.3 According to the usage function, most rooms or important rooms shall be arranged in the parts with good insolation, daylight, ventilation and sight. For the rooms that have requirement of privacy, it shall prevent the sight disturbance.

6.1.4 The floor plan layout shall better have specific flexibility.

6.1.5 The floor plan layout of the buildings in the seismic zone shall better be clear and neat, and shall better not have stagger layers.

6.2 Story height and indoor net height

6.2.1 The storey height of the building shall be determined combining the architectural usage function, technology requirements and technical economic conditions, and shall meet the requirements of the special code for the architectural design.

6.2.2 The indoor net height shall be calculated according to the vertical distance from the complement surface of the floor and ground surface to the suspended ceiling or the bottom surface of the floor plate or beam; when the suspended component of the floor, roof or the bottom of the pipe influence the effective usage space, it shall be calculated according to the vertical distance from the complement surface of the floor or ground surface to the bottom of the suspended component or the bottom of the pipe.

6.2.3 The indoor net height of the rooms in the building shall meet the specifications in the special code for the architectural design; the net height of the lowest place in the basement, local interlayer, corridor and so on that has normal activity of the people shall not be less than 2 m.

6.3 Basement and semi-basement

6.3.1 There shall have measures to synthetically solve the usage functions for the basement and semi-basement, the functional spaces and all kinds of passageways of the underground garage, underground people’s air defense, all kinds of facility rooms and so on, shall be reasonably arranged; the places between the underground space and urban subway, underground pave way and underground space shall be developed synthetically, connected in each other, they shall have definite direction guide, short and convenience flow line.

6.3.2 When the basement and semi-basement uses as the main rooms, they shall meet the requirements of safety and sanitation, and shall meet the following requirements:

1 It is forbidden to set the living room for children and old people in the basement and semi basement;

2 The room in the residential building shall not be arranged in the basement; when it is arranged in the semi-basement, the measures for daylight, ventilation, insolation, moisture proof, drainage and safety protection shall be adopted.

3 Singing and dancing, entertainment, screening, pleasure places in the building shall not be arranged in two layers down the ground or more than two layers underground; when setting in the first layer underground, the height difference between the ground surface of it and the floor on grade in the outdoor passageway shall not be larger than 10 m.

6.3.3 The outside enclosure of the basement shall be clear and neat, its water proof grade and technical requirements not only shall meet the specifications in the current national standard “Technical Code for Water Proof of the Underground Engineering” GB 50108, but also shall meet the following specifications:

1 The water catch basin shall be set in one place or several places where the ground surface is relative low in the basement, and the power supply of the draining pump and drainage pipeline shall be obligated;

2 There shall have measures to prevent water emerging and flow reversing in the places like underground pipes, underground pipe tunnel, underground gallery and mine, floor drain, window well and so on.

6.3.4 The fire protection rating, fire zone, safety evacuation, anti-smoke evacuation facilities, indoor decoration in the room and so on of the basement, semi-basement shall meet the relative specifications of fire proof code.

6.4 Mechanical floor, refuge storey and open floor

6.4.1 The arrangement of the mechanical floor shall meet the following specifications:

1 The net height of the mechanical floor shall be determined by the installation and maintenance needs of the facilities and pipelines;

2 In the room that has relative more pipelines on top of the buildings of hotels and residential buildings, when the lower part has large space rooms or changes into room with other functions so that the pipelines need to be changed, the mechanical floors shall better be set between the upper part and lower part;

3 The arrangement of the mechanical layer shall be convenience for the access of the municipal pipelines; the mechanical rooms that have influences in fire proof, anti-explosion and sanitation shall not be arranged near each other;

4 The mechanical floor shall have natural ventilation and mechanical ventilation; when the mechanical floor is arranged in the basement and there is no mechanical ventilation facility, the ventilation inlet and the ventilation stack shall be set in the external wall in the basement, the area shall meet the requirements of wind sending amount and discharging amount;

5 The machine room of the water supply and discharging facilities shall set water catch basin and obligate the power supply of the draining pump, the drainage pipeline and joint, the electricity distribution room shall meet the laying of the circuitry;

6 For the layout position and the enclosure of the mechanical rooms, when the pipeline goes through the partition, fire proof wall, floor and so on they shall meet the relative specifications in the fire proof code.

6.4.2 For the super-high rise building which height is more than 100 m, the refuge storey (room) shall be set.

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6.4.3 For the open floor and refuge storey that have normal activities of people, the net height shall not be lower than 2 m.

6.5 W.C., Washing room and bathing room

6.5.1 W.C., Washing room and bathing room shall meet the following specifications:

- 1 W.C., Washing rooms and bathing rooms in the building shall not be directly arranged on top of the rooms that have severe sanitation requirement or water proof, moist proof requirements like dining hall, food processing room, food storing room, medicine, medical treatment, transforming and distribution of electricity and so on; except the own set of house, the washing room in the residential building shall not directly arranged above the lower layer of bed room, living room, kitchen and dining room;
2 The number of the arrangement of the sanitation facilities shall meet the specification in the special architectural design code, in the public W.C., the ratio of man one and the women one, the ratio of the women one shall be properly increased;
3 The sanitation room shall better have natural daylight and the natural ventilation towards the adjacent room, for the room that there is no direct ventilation, cold district and severe clod district, the natural ventilation stack shall better be set ; when the natural ventilation can not meet the need for ventilation and air renewal, the mechanical ventilation shall be adopted.
4 In the places of floor, ground surface, groove of the floor and ground surface, pipeline goes through the floor and the place for the pipelines going through the connection of the floor and floor wall shall have strict water proof and leakage proof;
5 The surface layer of floor and ground, wall surface or wainscot shall adopt materials that do not absorb water, dust, anti-crossion, easy to clean;
6 The floor and ground surface shall have anti-sliding methods, the elevation of them shall better a little bit lower than the one of corridor, and there shall be slope which direction is towards the floor drain or waterway;
7 The indoor water supply and discharge pipes and ceiling in the bathroom shall prevent the falling down of the condensed water; the hot water pipe in the bathroom shall prevent scalding people;
8 Front room or shelter shall be set for public toilets for men and women;
9 Independent janitorial supplies room shall be set for public toilets.

6.5.2 Plane dimensions of toilet and bath room compartment shall not be less than regulations in Table 6.5.2.

Table 6.5.2 Plane dimensions of toilet and bath room compartment

Table with 2 columns: Category and Plane dimensions (width m x depth m). Rows include Toilet compartment with outward opening door (0.90x1.20), Toilet compartment with inward opening door (0.90x1.40), Special toilet compartment for patients in hospital (1.10x1.40), Accessibility toilet compartment (1.40x1.80), Bathing compartment with outward opening door (1.00x1.20), Bathing compartment with dressing stool (1.00x(1.00+0.60)), and Accessibility special bathing room compartment (Tubbing 2.00x2.25, Shower bath 1.50x2.35).

6.5.3 Distance of sanitary facilities shall comply with the following regulations:

1 Clear distance between water faucet center of lavatory basin or washing basin and aisle wall surface shall be no less than 0.55m;

2 Distance between water faucet centers of paratactic lavatory basins or washing basins shall be no less than 0.70m;

3 Clear distance between outer bound of unilateral paratactic lavatory basin or washing basin and opposite wall surface shall be no less than 1.25m;

4 Clear distance between outer bounds of bilateral paratactic lavatory basins or washing basins shall be no less than 1.80m;

5 Clear distance between the long edge of tub and opposite wall surface shall be no less than 2m; clear width of short edge of accessibility tub in bathing room shall be no less than 2m;

6 Distance between centers of paratactic urinal spreaders shall be no less than 0.65m;

7 Clear distance between unilateral toilet compartment and opposite wall surface: when inward opening door is adopted, it shall be no less than 1.10m; when outward opening door is adopted, it shall be no less than 1.30m. Clear distance between bilateral toilet compartments: when inward opening door is adopted, it shall be no less than 1.10m; when outward opening door is adopted, it shall be no less than 1.30m;

8 Clear distance between unilateral toilet compartment and opposite urinal spreader or basin: when inward opening door is adopted, it shall be no less than 1.10m; when outward opening door is adopted, it shall be no less than 1.30m.

6.6 Step, Ramp and Railing

6.6.1 Step setting shall comply with the following regulations:

1 Foot step width for indoor and outdoor step of public buildings shall be no less than 0.30m; foot step height shall be no more than 0.15m and no less than 0.10m. Antiskidding measures shall be taken for foot step. The number of indoor foot steps shall be no less than 2, and ramp shall be adopted when altitude difference is insufficient for two foot steps;

2 Protective measures shall be taken in high-density people area with site step height exceeding 0.70m and free side face.

6.6.2 Ramp setting shall comply with the following regulations:

1 Indoor and outdoor ramp slope shall be no more than 1:8 and 1:10, respectively;

2 Broad step shall be set for indoor ramp with horizontal projected length exceeding 15m, and broad step width depends on application function or required cushion space for equipment dimensions;

3 Slope of ramp used for wheelchair and in difficult section shall be no more than 1:12 and 1:8, respectively;

4 Ramp length and slope of ramp for bicycle pushing shall not exceed 6m and 1:5, respectively;

5 Motor ramp shall comply with regulations of current national standard "Design Code for Garage" JGJ 100;

6 Antiskidding measures shall be taken for ramp.

6.6.3 Protective railing shall be set for such free positions as balcony, side corridor, indoor circular corridor, interior courtyard, person bearing roof and outdoor stair, and comply with

the following regulations:

1 Railing shall be fabricated by firm and perdurable materials, and able to bear horizontal load prescribed in load specifications;

2 Height of railing shall be no less than 1.05m when height of free surface is below 24m; and height of railing shall be no less than 1.10m when height of free surface is equal to 24m or higher than 24m (including medial and high-rise buildings);

Note: Height of railing shall be vertical height calculated from building floor or roof to top surface of railing, and it shall be calculated from top surface of step position, if it existed at the bottom with width no less than 0.22m and height no more than 0.45m.

3 Space shall not be left in 0.10m height of railing from floor or roof;

4 Structures preventing children climbing must be adopted for railings in residences, nursery, kindergarten, primary/secondary school and special places for children, and clear distance between railings shall be no more than 0.11m when vertical rail is adopted;

5 Clear distance between railings shall be no more than 0.11m when vertical rail is adopted in the place permitting children entering into, such as entertainments buildings, commercial service buildings, sport buildings and landscape buildings.

6.7 Staircase

6.7.1 Quantity, position, width and stair hall form of staircase shall satisfy requirements of convenient application and safe evacuation.

6.7.2 Except for complying with regulations of fire prevention code, horizontal distance between wall surface and center line of railing or between railings, namely width of stair horse, for daily major traffic shall be determined by the number of pedestrian flow of $0.55+(0\sim 0.15)m$, and the number shall be no less than two. $0\sim 0.15m$ is oscillation amplitude of human body in marching pedestrian flow, and upper limit value shall be taken for public buildings with crowd pedestrian flow.

6.7.3 Minimum width of platform at turning end of railing shall be no less than width of stair horse when stair horse changes direction, and not below 1.20m. The width shall be properly widened if required for large-scale articles convey.

6.7.4 The number of foot steps for each stair horse shall be no more than 18 and no less than 3.

6.7.5 Clear height at gang way above and below stair platform shall be no less than 2m, and that of stair horse shall be no less than 2.20m.

Note: Clear height of stair horse is vertical height from front edge of self-foot step (including the range in 0.30m out of front edge of the lowest and highest step) to bottom edge of above overhang.

6.7.6 Railing shall be set on least one side of stair, it shall be set on both sides when clear distance of stair horse reaches three pedestrian flows, and middle handrail shall be set when it reaches four pedestrian flows.

6.7.7 Railing height of indoor stair shall be no less than 0.90m when measured from front edge of self-foot step, and the height shall be no less than 1.05m when horizontal railing length adjacent to one side of stair well exceeds 0.50m.

6.7.8 Antiskidding measures shall be taken for foot step.

6.7.9 Measures to prevent children from climbing and sliding must be adopted for stairs in nursery, kindergarten, primary/secondary school and special places for children when

clear width of stair well exceeds 0.20m, and structures hard to climb shall be adopted for railing of stair. Clear distance between railings shall be no more than 0.11m when vertical rail is adopted;

6.7.10 The ratio of height and width for foot step of staircase shall comply with regulations in Table 6.7.10.

Table 6.7.10 Minimum width and maximum height of foot step of staircase (m)

Category of staircase	Minimum width	Maximum height
Public staircase for residence	0.26	0.175
Staircase for kindergarten or primary school	0.26	0.15
Staircase for cinema, theater, gymnasium, market, hospital, hotel, university and middle school	0.28	0.16
Staircase for other buildings	0.26	0.17
Special dispersal staircase	0.25	0.18
Service staircase, staircase in residence	0.22	0.20

Note: Foot step width of screw stair without newel post and curved stair at 0.25m from inboard rail center shall be no less than 0.22m.

6.7.11 Special service staircase for old person, disabled person and other applications shall comply with regulations of design code for special buildings.

6.8 Elevator, Escalator and Moving Walkway

6.8.1 Elevator setting shall comply with the following requirements:

- 1 Elevator shall not be reckoned in emergency opening;
- 2 The number of elevators for each building shall be no less than 2 for high-rise public buildings or high-rise residential buildings of 12 stories or more than 12 stories with elevator as main vertical traffic tools;
- 3 In each service area of buildings, elevators in unilateral arrangement shall not exceed 4, and elevators in bilateral arrangement shall not exceed 2×4. Elevator shall not be closely arranged at corner;
- 4 Depth of elevator hall shall comply with regulations in Table 6.8.1, and be not below 1.50m;

Table 6.8.1 Depth of elevator hall

Category of staircase	Arrangement way	Depth of elevator hall
Residential elevator	Single	$\geq B$
	Unilateral arrangement for multiple elevators	$\geq B^*$
	Bilateral arrangement for multiple elevators	\geq Sum of B^* of opposite elevator and $\leq 3.50\text{m}$
Elevator for public buildings	Single	$\geq 1.5B$
	Unilateral arrangement for multiple elevators	$\geq 1.5B^*$, and $\geq 2.40\text{m}$ when the number of elevator is 4
	Bilateral arrangement for multiple elevators	\geq Sum of B^* of opposite elevator and $\leq 4.50\text{m}$
Elevator for sickbed	Single	$\geq 1.5B$
	Unilateral arrangement for multiple elevators	$\geq 1.5B^*$
	Bilateral arrangement for multiple elevators	\geq Sum of B^* of opposite elevator

Note: B is depth of cab, and B^* is maximum depth of cab in multiple elevators.

5 Shaft and machine room of elevator shall be kept away from the room with silent requirements, or vibration isolation and sound proof measures shall be taken;

6 Machine room shall be special room, and heat preservation or thermal insulation measures shall be taken for enclosing construction. Meanwhile, the room inside shall be well ventilated, dustproof and natural lighting. Top plate of machine room mustn't be used as bottom floor of water tank, and water pipe or steam pipe mustn't be directly passed through the room;

7 Arrangement of firefighting elevator shall comply with regulations of firefighting specifications.

6.8.2 Escalator and moving walkway shall comply with the following requirements:

1 Escalator and moving walkway shall not be reckoned in emergency opening;

2 Width of straightway area at entrance and exit shall be no less than 2.50m, and it shall be widened for high-density pedestrian flow;

3 Breast board shall be flat, smooth and free of outshoot; vertical height from top of hand strap to front edge of escalator, foot step surface or adhesive tape surface of moving walkway shall be no less than 0.90m, distance between outer surface of hand strap and any obstacles shall be no less than 0.50m, or effective measures shall be taken to prevent people from the damage of obstacles;

4 Distance between center line of hand strap and parallel wall surface or the edge of floor slab opening, as well as horizontal distance between center lines of hand strap in two adjacent pathways under parallel arrangement, shall be no less than 0.50m, or effective measures shall be taken to prevent people from the damage of obstacles;

5 Vertical clear height shall be no less than 2.30m above ladder step of escalator, foot step or adhesive tape of moving walkway;

6 Inclined angle of escalator shall not exceed 30° in normal conditions, and it is permitted to increase to 35° when lifting height and nominal speed are respectively no more than 6m and 0.50m/s; inclined angle of inclined moving walkway shall not exceed 12°;

7 Accordant staircase shall be arranged closely when escalator or moving walkway intercommunicated between stories is one-way set;

8 Intercommunicated space between stories formed by escalator or moving walkway shall comply with requirements of fire-protection zoning regulations in firefighting specifications.

6.9 Wall Body and Deformation Joint

6.9.1 New-type constructional material shall be adopted for wall body based on local conditions.

6.9.2 Heat preservation, thermal insulation and/or damp proofing measures shall be taken for out wall according to local climate and building requirements.

6.9.3 Damp proofing of wall body shall comply with the following requirements:

1 Continuous damp proofing layer shall be set for masonry wall above outdoor ground and at indoor ground cushion; additional damp proofing layer shall be set for lateral wall body at altitude difference position when altitude difference exists between adjacent indoor grounds;

2 Damp proofing layer shall be set for outer door and inside of inner door for damp room;

3 Dado shall be set for indoor surface according to water proofing, damp proofing,

antifouling and collision preventing requirements if necessary.

Note: Damp proofing layer in seismic region shall meet requirements of earthquake-proof integral connection for buildings.

6.9.4 Measures to prevent climbing into house shall be adopted for overhang on outer wall of buildings, such as window sill, bay window, balcony, shelf for air conditioner, rain pipe, vent pipe and decorative yarn.

6.9.5 Reinforcement measures shall be taken at openings or windows for outer wall to prevent strain crack.

6.9.6 Deformation joint setting shall comply with the following requirements:

1 Deformation joint shall be designed according to characters and conditions of joint to prevent it from resistance and damage and prevent buildings from damage during its displacement or deformation;

2 Measures for waterproof and drainage, firefighting, heat preservation, anti-aging protection, corrosion prevention, moth proofing and/or desquamation prevention shall be taken for structures and materials of deformation joint according to position requirements.

6.10 Door and Window

6.10.1 Products of door and window shall comply with the following requirements:

1 Materials, dimensions, functions and quality of door and window shall comply with usage requirements and regulations of product standard of door and window for building;

2 Fittings of door and window shall match with their main body, and comply with technical requirements of various materials;

3 Door and window for building with good performances in energy conservation, sealing, noise insulation and dewfall prevention shall be extended for their widespread application.

Note: Door and window processing dimensions shall be the clear dimensions, namely design dimensions of door and window openings extracted by thickness of finished materials for wall surface.

6.10.2 Connections between door and/or window and wall body shall be firm, and satisfy requirements of air pressure resistance, water proofing and air proofing, and corresponding sealing materials shall be selected for door and window with different materials.

6.10.3 Window setting shall comply with the following requirements:

1 The opening form of window sash shall be convenient to use, safe, and easy to maintain and clean;

2 Reinforcement measures shall be taken for window sash when outward opening window is adopted;

3 Bottom height of window sash opening to public walkway shall be no less than 2m;

4 Protective measures shall be taken for free window with sill lower than 0.80m, and protective height shall be no less than 0.80m calculated from floor;

5 Window opening shall be set according to firefighting specifications when it must be set on fire-protecting wall;

6 Pervious materials able to prevent from crashing and damaging human body shall be adopted for skylight;

7 Measures shall be taken for skylight to prevent condensed water generation or drain out condensed water;

8 Skylight shall be easy to open, close and fix, bleed proofing, and convenient to clean.

Note: 1 Protective measures shall be taken when window sill for residence is lower than 0.90m;

2 Protective height of guard rail clung to window or fixed window shall be calculated from window sill surface when low window sill and bay window have wide window sill for human standing below.

6.10.4 Door setting shall comply with the following requirements:

1 Ante port structure shall be convenient to open and sturdy;

2 Brake apparatus shall be provided for manual open gate, and derail preventive measures shall be taken for horizontal sliding door.

3 Transparent safe glass shall be mounted at visible height for double swinging door;

4 Flat-opening egress door shall be set adjacent to or on circulating door, motor-driven door, roller shutter and large-scale door;

5 Horizontal egress walkway and door between staircases shall not influence egress width of walkway and stair platform when sufficiently opened;

6 Safety glass or effective measures shall be adopted for full glass door with anti-collision mark;

7 Door opening shall not go beyond deformation joints.

6.11 Building Curtain Wall

6.11.1 Technical requirements of building curtain wall shall comply with the following regulations:

1 Section materials, sheet materials, sealing materials, metal accessories and fittings shall comply with regulations of current relevant standards;

2 Physical properties of curtain wall, including wind load deformation, rain leakage, air leakage, heat preservation, sound isolation, impact resistance, in-plane deformation, firefighting, lightning proofing, shock resistance and optical performance, shall comply with regulations of current relevant standards.

6.11.2 Glass curtain wall shall comply with the following regulations:

1 Glass curtain wall used for aseismatic area and building height shall comply with requirements of relevant specifications;

2 Safety glass with anti-shock performance shall be adopted for glass curtain wall;

3 Segregation of glass curtain wall shall be firmly connected with floor slab, beam and/or partition wall, and comply with requirements of fire protection division;

4 Opening area of glass window sash shall be fixed with sufficient safety according to specs of curtain wall materials and requirements of wind scoop.

6.12 Flooring

6.12.1 Basic structural layer of strata floor shall be surface coat, cushion coat and foundation; basic structural layer of storey shall be surface coat and floor slab. When basic structure of strata floor or storey can't meet usage or structural requirements, other structural layers, such as binder course, separation layer, packed layer, leveling blanket and/or heat preservation layer shall be set additionally.

6.12.2 Except for special application requirements, flooring shall be even, wearable, free of

dust emission, slip resistant, pollutant resistant, noise proofing, and convenient to clean.

6.12.3 Waterproof and slip resistance surface coat lower than adjacent storey floor shall be adopted for flooring in toilet, bathing room and kitchen usually soaked by water or non-corrosive liquid, and drainage slope inclined to water leak shall be set; waterproof separation layer must be set for toilet, bathing room and buildings floor with waterproof requirements; cast-in-place concrete or precast concrete flag with concrete strength no less than C20 must be adopted for storey structure; concrete flanging shall be constructed around floor except for door openings, and its height shall be no less than 120mm.

Flooring usually under water stream shall be lower than adjacent flooring, or water-retaining facilities (such as doorsill) and corresponding drainage measures shall be taken. Water resistant, easy-to-flush and slip resistant surface materials shall be adopted for flooring, and waterproof separation layer shall be set.

6.12.4 Measures for damp resistance, frost heaving prevention for foundation soil and uneven subsidence prevention shall be taken for ground built on foundation soil according to requirements.

6.12.5 **For the room used as storage of food, foodstuff, seed or drugs, it is forbidden to use toxic materials as flooring when stored materials directly contacted with flooring, and the toxicity of materials shall be identified by relevant hygiene and disease control departments. Flooring materials with foreign flavor emitting shall not be adopted for stored food with strong flavor adsorption ability.**

6.12.6 Recoverable rigid materials composed of plate, block materials and concrete, or flexible structures composed of grain and grey soil shall be adopted for flooring bearing large load or under action of impacting force, according to application properties and site.

6.12.7 Measures for firefighting, corrosion resistance, damp proofing, moth proofing and/or ventilation shall be taken for wooden flooring shall according to corresponding application requirements.

6.12.8 Heat preservation measures needn't be adopted for flooring in heating room, but local heat preservation measures shall be taken under one of the following conditions:

1 Overhead or overhanging flooring directly affronted to outdoor or adjacent to non-heating room;

2 When no heating pipe duct is arranged around buildings in severe cold region, heat preservation measures shall be taken for strata floor in the range of 0.50~1.00m inside of outer wall, and its heat transfer resistance shall be no less than that of out wall.

6.13 Roof and Suspended Ceiling

6.13.1 Waterproof grade for roof engineering shall be fixed according to properties, important degree and application functions of buildings as well as rational application period of waterproof layer, combined with project characters and regional natural conditions.

6.13.2 Drainage gradient of roof shall be fixed according to roof structural form, roof substratum category, waterproof structural form, materials form and local climate, and comply with regulations in Table 6.13.2.

Table 6.13.2 Drainage gradient of roof

Roof category	Drainage gradient of roof (%)
Rolling materials waterproof, rigid waterproof flat roof deck	2~5
Book tile	20~50
Corrugated tile	10~50
Bituminized tile	≥20
Net rack, suspended cable structural metal plate	≥4
Profiled sheet	5~35
Planting soil roof	1~3

Note: 1 Slopes made by structure and material shall be no less than 3% and 2% for flat roof deck, respectively;

2 Slope of rolling materials surface shall be no more than 25%, and fixation and anti-sliding measures shall be taken when its slope exceeds 25%;

3 Longitudinal slope of drain gutter and eaves gutter shall be no less than 1% for rolling materials waterproof roof, water fall head shall not exceed 200mm in the bottom of gutter. Drainage of drain gutter and eaves gutter shall be not flow through deformation joint and fire-protecting wall;

4 Book tile must be firmly laid, and fixation measures shall be adopted for roof in earthquake-proof area or with slope higher than 50%;

5 Slopes of overhead thermal insulation roof and planting soil roof shall be no more than 5% and 3%, respectively.

6.13.3 Roof structure shall comply with the following requirements:

1 Noncombustible materials shall be adopted for roof surface layer, including projection of roof and air-right structure, but waterproof layer by combustible rolling materials can be used for substratum of incombustible roof in fire-proof grade 1 and 2 buildings.

2 Outlet drainage shall be preferentially adopted for roof drainage; internal drainage shall be adopted for high-rise building, multi-span roof and roof with large catchment area; the number and diameter of down pipe for roof water shall be fixed by check computation (calculation);

3 Waterproof reinforcement measures shall be taken for drain gutter, eaves gutter, cornice, fall trap, flashing, deformation joint and pipe protruded out of roof according to project characters, and comply with regulations of relevant regulations;

4 Fixation and anti-sliding measures shall be taken for roof when its slope or roof fall is relatively high; book tile shall be laid firmly;

5 Fixation and reinforcement measures shall be taken in earthquake-proof region or the region under strong wind;

6 Hot working check computation shall be passed for roof with heat preservation layer, and measures to prevent dewfall, steam penetration, as well as damp on heat preservation layer during construction shall be taken;

7 For roof with overhead thermal insulation layer, the height of overhead insulation layer depends on width or slope of roof, and overhead layer mustn't be blocked. Ventilation roof ridge shall be set when roof width is more than 10m; heat preservation layer of proper thickness shall be provided on roof substratum;

8 Protective measures for efflorescence resistance and erosion resistance shall be taken for roof board with meshcement or reinforcement concrete thin-walled member; crack resistant measures shall be provided for rigid waterproof roof;

9 Inspection manhole to climb roof when no stair is available to roof, or outer wall access ladder shall be set for roof height lower than 10m. Effective measures shall be taken for safe guarding and preventing children from climbing;

10 Ventilation hole and inspection manhole shall be provided for loft; fire protecting partition wall shall be set in loft.

6.13.4 Structure of suspended ceiling shall comply with the following requirements:

1 Safe structure measures shall be taken between suspended ceiling and main structure; maintenance space shall be left in suspended ceiling of tall big hall; maintenance walkway or manhole convenient to enter into suspended ceiling shall be set according to requirements and comply with relevant firefighting and safety requirements;

2 When more pipelines are set in suspended ceiling and limit space is inconvenient for maintenance, dismountable packaged type suspended ceiling board can be adopted, and maintenance hand hole shall be set in necessary position;

3 Measures to prevent the generation of condensed water shall be taken when up-and-down water pipe is laid in suspended ceiling;

4 Waterproof materials and measures to prevent dewfall tricking water shall be taken for suspended ceiling of wet room; cast-in-place board shall be taken for reinforced concrete top board.

6.14 Pipe Shaft, Smoke Flue, Air Relief Shaft and Garbage Shaft

6.14.1 Pipe shaft, smoke flue, air relief shaft and garbage shaft shall be independently set and mustn't be incorporated in one pipe system. In addition, they shall be fabricated by non-combustible materials.

6.14.2 Pipe shaft setting shall comply with the following requirements:

1 Sectional dimensions of pipe shaft shall meet requirements of pipe installation and required maintenance space;

2 Access door or dismountable wall slab shall be set for pipe shaft at the side adjacent to public walkway in each storey;

3 Pipe with influences on each other in safety, fire protection and sanitation shall not be laid in the same shaft;

4 Shaft wall, access door and shaft opening of pipe shaft shall comply with relevant regulations of firefighting specification.

6.14.3 Section, configuration, dimensions and inner wall of smoke flue and air relief shaft shall be convenient for unhindered smoke emission and preventing the generation of such phenomena as retardation, eddy current, wallop, air leakage and blow-in smoke.

6.14.4 Smoke flue and air relief shaft shall be protruded out of roof with height in favor of smoke diffusion, and the height shall be fixed according to roof form, height and distance of obstacle around exhaust opening, and snow thickness. Protruding height shall be no less than 0.60m for flat roof and not below height of parapet. Protruding height of patched roofs shall comply with the following requirements:

1 Center line of smoke flue and air relief shaft shall be 0.60m higher than roof ridge when their distance is below 1.50m;

2 Center line of smoke flue and air relief shaft shall be higher than roof ridge and its protruding height out of roof shall be no less than 0.60m, when the distance between center line

and roof ridge is in 1.50~3.00m;

3 When distance between center line of smoke flue (and air relief shaft) and roof ridge is more than 3m, the angle between the connecting line from their top to roof ridge and horizontal line shall be no more than 10°, and its protruding height out of roof shall be no less than 0.60m.

6.14.5 Garbage shaft shall not be set in civil building. Effective measures corresponding to garbage collecting method shall be set for multi-storey building without garbage shaft. Enclosed garbage classification, storage and collection space equipped with rinsing and drainage measures shall be set in each storey for medial and high-rise buildings and high-rise buildings without garbage shaft.

6.14.6 Garbage shaft setting shall comply with the following regulations:

1 Garbage shaft shall be collocated close to outer wall with main body protruded out of roof, and cover, net barrier and flow backward resistant measures shall be provided for protruding out part;

2 Sanitary isolation measures shall be provided at garbage exit, and the method for bottom storage and transportation of garbage shall be corresponding to domestic garbage management method;

3 Inner wall of garbage shaft shall be smooth and free of outshoot;

4 Garbage hopper shall be fabricated by noncombustible and corrosion resistant materials and could automatically close and seal; garbage hopper for high-rise building and super-tall building shall be set in front room of garbage shaft, and Class III fire-protecting door shall be adopted for the front room.

6.15 Indoor and Outdoor Decoration

6.15.1 Indoor and outdoor decoration shall comply with the following requirements:

1 Indoor and outdoor decoration mustn't damage safety of building structure;

2 Energy saving and green building materials shall be adopted for indoor and outdoor decoration;

3 Decorative materials and auxiliary materials for firefighting, pollution resistance, damp resistance, waterproofing as well as noxious gas and radial controlling shall be adopted for indoor and outdoor decoration engineering according to different application requirements;

4 Indoor and outdoor decoration for protective buildings shall comply with regulations of relevant building protection ordinances.

6.15.2 Indoor decoration shall comply with the following regulations:

1 Indoor decoration shall not screen fire symbols, evacuation indicatory signs and fire escape, and not influence usual usage of firefighting facilities and evacuation walkway;

2 Indoor redecoration, if necessary, mustn't change initial facilities, equipments and pipeline system voluntarily.

6.15.3 Outdoor decoration shall comply with the following regulations:

1 Outer wall decoration must be firmly connected with main structure;

2 Thermal insulation materials out of outer wall shall be firmly connected with main structure and outer wall veneer, and effective measures shall be taken for crack prevention, waterproofing, frost prevention, corrosion resistance, efflorescence prevention and desquamation prevention;

3 Outer wall decoration shall prevent intense light reflection polluting environment.

7 Indoor Environment

7.1 Daylighting

7.1.1 Calculation of daylight factor shall be carried out for various buildings, and standard value of daylight factor shall comply with the following regulations.

1 Standard value of daylight factor of residential building shall comply with regulations in Table 7.1.1-1.

Table 7.1.1-1 Standard value of daylight factor of residential building

Daylight grade	Room name	Lateral daylighting	
		Minimum value of daylight factor C_{min} (%)	Critical illuminance of interior daylight (lx)
IV	Living room, bedroom, study room, kitchen	1	50
V	Toilet, hall, stair well, dining room	0.5	25

2 Standard value of daylight factor of office building shall comply with regulations in Table 7.1.1-2.

Table 7.1.1-2 Standard value of daylight factor of office building

Daylight grade	Room name	Lateral daylighting	
		Minimum value of daylight factor C_{min} (%)	Critical illuminance of interior daylight (lx)
II	Design room, drafting room	3	150
III	Office, video studio, meeting room	2	100
IV	Copying room, filing room	1	50
V	Walkway, stair well, toilet	0.5	25

3 Standard value of daylight factor of school building shall comply with regulations in Table 7.1.1-3.

Table 7.1.1-3 Standard value of daylight factor of school building

Daylight grade	Room name	Lateral daylighting	
		Minimum value of daylight factor C_{min} (%)	Critical illuminance of interior daylight (lx)
III	Class room, lecture theater, laboratory, auditorium	2	100
V	Walkway, stair well, toilet	0.5	25

4 Standard value of daylight factor of library building shall comply with regulations in Table 7.1.1-4.

Table 7.1.1-4 Standard value of daylight factor of library building

Daylight grade	Room name	Lateral daylighting		Top daylighting	
		Minimum value of daylight factor C_{min} (%)	Critical illuminance of interior daylight (lx)	Average value of daylight factor C_{av} (%)	Critical illuminance of interior daylight (lx)
III	Reading room, open-shelf stack room	2	100	--	--
IV	Catalogue room	1	50	1.5	75
V	Stack room, walkway, stair well, toilet	0.5	25	--	--

5 Standard value of daylight factor of hospital building shall comply with regulations in Table 7.1.1-5.

Table 7.1.1-5 Standard value of daylight factor of hospital building

Daylight grade	Room name	Lateral daylighting		Top daylighting	
		Minimum value of daylight factor C_{min} (%)	Critical illuminance of interior daylight (lx)	Average value of daylight factor C_{av} (%)	Critical illuminance of interior daylight (lx)
III	Consulting room, drugstore, room for medical treatment, laboratory	2	100	—	—
IV	Waiting room, registry, hall in general, sick room, doctor office (nurses room)	1	50	1.5	75
V	Walkway, stair well, toilet	0.5	25	—	—

Note: Standard values of daylight factor listed in Table 7.1.1-1 to 7.1.1-5 are suitable for Grade III daylight climate region. Standard values of daylight factor in other regions shall be multiplied with daylight climate coefficient of corresponding region.

7.1.2 Calculation of effective daylighting area shall comply with following regulations:

- 1 The part of side window daylight opening at 0.80m below from floor shall not be reckoned in effective daylighting area;
- 2 For side window daylight opening under such overhanging obstruction as side corridor, colony with effective width more than 1m, its effective daylighting area shall be calculated by 70% of daylight opening area;
- 3 For flat skylight daylight, its effective daylighting area shall be calculated by 2.50 times of lateral daylight opening area.

7.2 Ventilation

7.2.1 Windows or openings directly vented to outdoor atmosphere shall be provided in buildings, or natural ventilation tunnel or mechanical ventilation facilities shall be set.

7.2.2 For room with direct natural ventilation, its ventilation opening area shall comply with following regulations:

1 Effective area of ventilation opening in living or working room shall not be less than 1/20 of floor area of the room;

2 Effective area of ventilation opening in kitchen shall not be less than 1/10 of floor area of the room and 0.60 m²; oil fume removal equipment and discharge flue shall be set above cooking range of kitchen.

7.2.3 Natural ventilation tunnel or ventilation equipment shall be set for living room, kitchen and toilet in severe cold region.

7.2.4 Mechanical ventilation facilities and ventilation tunnel shall be set for bath room without outer window and toilet.

7.2.5 Air-inlet abatvent shall be set, or air-inlet aperture shall be preserved at the bottom of window for kitchen or toilet.

7.2.6 Natural ventilation tunnel shall be located at opposite side of window or air-inlet opening.

7.3 Heat Preservation

7.3.1 Building shall be located at sunny and lee section without sunshine shelter.

7.3.2 The shape of building with heat supply shall reduce outer surface area.

7.3.3 Outer thermal insulation technology with enclosing construction shall be adopted for building in severe cold region, and open stair well and side corridor shall not be built. Anteroom or other winter proofing measures shall be taken at entrance and exit. For buildings in cold region, open stair well and side corridor shall not be built, and anteroom or other winter proofing measures shall be taken at entrance and exit

7.3.4 For outer door or window of buildings, its joint length shall be decreased, and sealing measures shall be taken. Energy consumption type shall be adopted for outer door or window.

7.3.5 Buildings with central heating shall be constructed in severe cold and cold region, and its building thermal and heating design shall comply with regulations of relevant energy conservation design standards.

7.3.6 Energy consumption design for buildings in region of hot summer and cold winter as well as region of hot summer and warm winter shall comply with regulations of relevant energy conservation design standards.

7.4 Heat Prevention

7.4.1 Buildings with heat prevention in summer shall comply with following regulations:

1 Comprehensive measures of green environment, effective natural ventilation, outer enclosing construction, and building sunshade shall be taken for building heat prevention in summer.

2 General planning of building, plane space organization of building, section design as well setting of door and window shall all be favorable for indoor ventilation.

3 Effective sunshade and heat prevention measures shall be taken for east window, west window, outer wall and roof of buildings.

4 Heat prevention design for summer shall be carried out for outer enclosing construction

of buildings, and comply with regulations of relevant energy conservation design standards.

7.4.2 Buildings with air conditioning shall comply with following regulations:

- 1 Outer surface area of building shall be reduced;
- 2 Air conditioning rooms shall be relatively arranged densely;
- 3 Outer window of air conditioning room shall be well sealed and heat insulated. Sunshade measures energy conservation windows shall be set and for sunny window;
- 4 Positions of outdoor air conditioning machines shall be designed and installed in uniform way for buildings with non-central air conditioning facilities.
- 5 For air conditioning buildings used intermittently, light materials shall be adopted for inside of outer enclosing construction and inner enclosing construction; for air conditioning buildings used continuously, heavy materials shall be adopted for inside of outer enclosing construction and inner enclosing construction;
- 6 Outer enclosing construction of buildings shall comply with regulations of relevant energy conservation design standards.

7.5 Sound Insulation

7.5.1 Indoor allowable noise limits for various rooms in civil buildings shall comply with regulations in Table 7.5.1.

Table 7.5.1 Indoor allowable noise limits (daylight)

Category of buildings	Room name	Allowable noise limits (Sound level A, dB)			
		Super grade	Grade 1	Grade 2	Grade 3
Residence	Bedroom, study room	—	≤40	≤45	≤50
	Sitting room	—	≤45	≤50	≤50
School	Room with special silent requirement	—	≤40	—	—
	Common classroom	—	—	≤50	—
	Room without special silent requirement	—	—	—	≤55
Hospital	Day room for patients and medical personnel	—	≤40	≤45	≤50
	Clinic	—	≤55	≤55	≤60
	Operating room	—	≤45	≤45	≤50
	Audiometric test room	—	≤25	≤25	≤30
Hotel	Guest room	≤35	≤40	≤45	≤55
	Meeting room	≤40	≤45	≤50	≤50
	Multifunctional hall	≤40	≤45	≤50	—
	Office	≤45	≤50	≤55	≤55
	Dining room, banquet hall	≤50	≤55	≤60	—

Note: Indoor allowable noise limits value during the night is 10dB (A) lower than that in daylight.

7.5.2 Airborne sound attenuation standard for enclosing construction of different rooms (baffle wall, floor slab) shall comply with regulations in Table 7.5.2.

Table 7.5.2 Airborne sound attenuation standard

Category of buildings	Enclosing construction position	Weighted sound reduction index (dB)			
		Super grade	Grade 1	Grade 2	Grade 3
Residence	Bedroom, study room	—	≥50	≥45	≥40
School	Baffle wall, floor slab	—	≥50	≥45	≥40

Table 7.5.2 (Continued)

Category of buildings	Enclosing construction position	Weighted sound reduction index (dB)			
		Super grade	Grade 1	Grade 2	Grade 3
Hospital	Between sickrooms	—	≥45	≥40	≥35
	Between sickroom and noise generating room	—	≥50	≥50	≥45
	Between operating room and sickroom	—	≥50	≥45	≥40
	Between operating room and noise generating room	—	≥50	≥50	≥45
	Enclosing construction for audiometric test room	—	≥50	≥50	≥50
Hotel	Baffle room between guest rooms	≥50	≥45	≥40	≥40
	Baffle room between guest room and corridor (including door)	≥40	≥40	≥35	≥30
	Outer wall of guest room (including window)	≥40	≥35	≥25	≥20

7.5.3 Impact sound insulating standard for floor slab of different rooms shall comply with regulations in Table 7.5.3.

Table 7.5.3 Impact sound insulating standard

Category of buildings	Floor slab position	Weighted standardized impact sound pressure level (dB)			
		Super grade	Grade 1	Grade 2	Grade 3
Residence	Household room	—	≤65	≤75	≤75
School	Classroom	—	≤65	≤65	≤75
Hospital	Between sickrooms	—	≤65	≤75	≤75
	Between operating room and sickroom	—	—	≤75	≤75
	Upper part of audiometric test room	—	≤65	≤65	≤65
Hotel	Guest room	≤55	≤65	≤75	≤75
	Between guest room and impacting room	≤55	≤55	≤65	≤65

7.5.4 Noise reduction design of civil buildings shall comply with the following requirements:

1 For civil buildings with strong structural integrity, the measures to prevent structural sound transmission shall be taken on sound transmission source parts attached to wall body and floor slab;

2 Sound insulation, vibration insulation and sound absorbent measures shall be taken for equipment room with noise and vibration, and vibration damping and noise elimination treatment shall be adopted for equipment and pipe. In plain arrangement, equipment room with noise and vibration shall not be directly set above or adjacent to main room, and they shall be under sectional arrangement when set in the same storey.

3 Baffle wall shall be built to bottom surface of beam and/or floor slab when hung ceiling is set in the room with high silent requirements; sound insulation performance of light baffle wall shall comply with regulations of relevant sound insulation standards.

8 Building Equipments

8.1 Water Supply and Drainage

8.1.1 Water supply and drainage design for civilian construction shall comply with requirements of life and firefighting.

8.1.2 Drinking water quality shall comply with regulations of current national sanitary standards for drinking water.

8.1.3 Water basin (tank) for drinking water shall be divided from water basin (tank) for water of other applications.

8.1.4 Absolute construction form shall be adopted for the body of water basin (tank) for drinking water in buildings, and main structure of buildings mustn't be utilized for wall slab, bottom floor or top plate of water basin (tank). Body materials, lining materials and inner wall coating of water basin (tank) for drinking water shall not influence water quality.

8.1.5 Such pollution sources as fermenting tank, wastewater treatment structures, absorbing well and garbage dumps mustn't be set in 10m around underground storage tank for drinking water, and wastewater pipe and pollutants mustn't appear in 2m around the tank.

8.1.6 Water supply design for buildings shall comply with the following requirements:

1 Water supply based on quality shall be carried out, and circulated or recycled water supply system shall be preferentially adopted;

2 Water saving sanitary ware and water faucet shall be adopted;

3 Household water gauge shall be set for quantity measurement for residence, and water gauge shall be set for different users of public buildings;

4 Water pressure of domestic water supply system and firefighting water supply system in buildings shall comply with relevant regulations in water supply and drainage design code and firefighting specifications;

5 Directly-drinking water pipeline system can be mounted for newly-built residence and public buildings where condition permitted.

8.1.7 Building drainage shall comply with separate drainage principles for rainwater and domestic drainage, and middle water recycle system shall be set according to relevant national or local regulations.

8.1.8 In water resources shortage region, rain resource in sub-districts and on roof shall be sufficiently developed and utilized, and rain water shall be utilized in the method of infiltration or storage after proper pretreatment on the basis of local conditions.

8.1.9 Drainage pipe mustn't be arranged above cafeteria, and operation, cooking and food preparation positions for staple food and non-staple food in catering industry, and be traversed above drinking water tank.

8.1.10 Indoor water supply and drainage pipe shall not be arranged above raw materials, product and equipments that may burn and/or explode when contacted with water.

8.1.11 Drainage down pipe mustn't be traverse rooms with high requirements in sanitation and quiet, such as bedroom and sickroom. It also shall not be arranged near inner wall adjacent to bedroom.

8.1.12 Water supply and drainage pipe shall not traverse switching house, filing room, elevator machine room, communication machine room, large- and medium-scale computer networking center, audio-visual materials storage, etc, where water will damage equipments and/or cause accident.

8.1.13 Waterproof measures shall be taken where water supply and drainage pipe traverse outer wall of basement or wall of underground constructions.

8.1.14 Water supply and drainage pump room shall not set above, below or adjacent to the room with quiet requirements; drainage facilities shall be set in pump room, and waterproof layer shall be set on floor; impact and noise prevention measures shall be taken in pump room. Firefighting pump room shall comply with relevant regulations of fire-protecting specifications.

8.1.15 Low-noise product shall be adopted for water supply and drainage equipments and pipes, such as sanitary ware, water pump and cooling tower.

8.2 Heating, Ventilation and Air Conditioning

8.2.1 Design for heating, ventilation and air conditioning as well as their cold and heat source system in civil building shall meet requirements of safety, sanitation and building functions.

8.2.2 Indoor air design parameters and its sanitary requirements shall comply with regulations of current national standard “Design Code for Heating, Ventilation and Air Conditioning” GB 50019 and other relevant standards.

8.2.3 Heating design shall comply with the following requirements:

- 1 Hot water shall be adopted as heat transfer medium for heating system of civil buildings;
- 2 Prerequisite for heat supply metering shall be provided for heating system of residential building;
- 3 Valves and meters of central heating system for residential buildings required adjustment, check and maintenance by professionals shall not be set in private living unit; such facilities as valves and meters used for other living units shall not be set in a private living unit.
- 4 Radiator, pipe and connecting fittings of heating system shall meet requirements of system pressure.

8.2.4 Ventilation system shall comply with the following requirements:

- 1 Air inlet for mechanical ventilation system shall be set in the position with fresh and clean outdoor atmosphere;
- 2 Waste gas discharge shall not be set in the region with human retention or passing;
- 3 Noncombustible materials shall be selected for pipes of mechanical ventilation system;
- 4 Ventilation machine room shall not be arranged adjacent to the room with noise limit;
- 5 Partition wall of ventilation machine room and door on the wall shall comply with relevant regulations of fire protecting specifications.

8.2.5 Air conditioning system shall comply with the following requirements:

- 1 For civil building with air conditioning system, its storey height and suspended ceiling height shall meet requirements of air conditioning system;
- 2 Noncombustible materials shall be selected for wind pipe of air conditioning system;
- 3 Air conditioning machine room shall not be arranged adjacent to the room with noise limit;
- 4 Fresh air collecting inlet of air conditioning system shall be set in the position with fresh

and clean outdoor air;

5 Partition wall of air conditioning machine room and door on the wall shall comply with relevant regulations of fire protecting specifications.

8.2.6 Settings of refrigerating machine, pump room, heat exchanging station for civil building shall comply with the following requirements:

1 Entrance for large-scale equipment shall be left, and hoisting facilities shall be set aside in machine room with conditions;

2 Press polish cement floor shall be set, and water supply and drainage facilities shall be set for floor rinsing. Floor scupper or drainage open channel shall be set at water leakage or discharging positions for equipment;

3 Repair workshop, duty room, toilet, communication and emergency illumination shall be mounted;

4 Equipment shall be arranged for convenient operation and with adequate maintenance space;

5 Adverse influences caused by equipment vibration shall be prevented;

6 For room with ventilation and air renewal requirements, it shall be ensured that door closing could generate air flow when only air inlet or air exit is set indoor; for room with both air inlet and air exit, their positions shall be rationally designed to prevent short circuit of air flow.

8.2.7 The position of central boiler room for dwelling district shall be prevent district environment from the influence of fuel transportation, noise and pollutant discharge. Buildings, structures and site arrangement shall comply with relevant regulations in current national standard "Design Code for Boiler Room" GB50041.

8.2.8 Oil-burning and gas-burning boiler rooms (or other equipment room with combustion process) for civil building shall not be set in main building. Those set in main buildings, if necessary, shall comply with relevant specifications and regulations of local firefighting and safety department.

8.3 Building Electricity

8.3.1 Distribution substation in civil building shall comply with the following requirements:

1 Position selection for distribution substation shall comply with the following requirements:

1) It shall be adjacent to electricity utilization load center;

2) It shall be convenient for incoming line and outgoing line;

3) It shall be convenient for equipment hoisting and transportation;

4) It shall not be set below or adjacent to toilet, bathing room and other places usually under water; distribution substation equipped with electrical equipments with combustible oil shall not be set above, below or adjacent to high-density people area or along both sides of escape exit;

5) Distribution substation shall be screened when set above or below residence, guest room and office;

2 Distribution substation equipped with combustible oil-immersed transformer with total capacity not exceeding 1260KVA and single capacity not exceeding 630KVA can be arranged adjacent to outer wall in the first storey or underground storey I of building main body, and safety exit shall be set directly outward with Grade A fire door as door of transformer room; fire-proof

carbel table with width no less than 1m noncombustible body shall be above opening of outer wall;

3 Fire resistance ratings of combustible oil-immersed transformer, high-voltage distribution substation, low-voltage distribution substation and roof load-bearing member shall be respectively not lower than Grade A, Grade B, Grad C and Grade B;

4 High- and low-voltage distribution facilities without combustible oil and non-oil-immersed transformer can be set in the same room;

5 Natural lighting window unable to open and with distance from outdoor terrace no less than 1.80m shall be set for high-voltage distribution substation, and natural lighting window able to open and not adjacent to street shall be set for low-voltage distribution substation;

6 Exits shall be set at both ends of distribution room with length more than 7m, and an additional exit shall be set when the length higher than 60m;

7 Door of entrance and exit of transformer room and distribution substation shall be opened outward;

8 Facilities shall be set in transformer room and distribution substation to prevent rain, snow and small animals from entering into room through lighting window, ventilation window, door and cable trench;

9 Water proofing and drainage measures shall be taken for cable interlayer, cable trench and cable room in distribution substation;

10 Foreign pipe and line shall not be passed through distribution substation;

11 Equipotential bonding shall be set for distribution substation, control room and storey distribution substation;

12 Communication interface, as well as entrance and exit control shall be set for important place for distribution substation to communicate with outer world

8.3.2 Fire door grade of distribution substation shall comply with the following requirements:

1 For distribution substation set in high-rise building, it shall be separated with other parts by partition wall with fire endurance no less than 2h, floor slab with fire endurance no less than 1.5h and Grade A fire door;

2 The door from combustible oil-immersed transformer room to distribution substation or transformer room shall be Grade A fire door;

3 The door of distribution substation towards each other shall be Grade C fire door;

4 The door of distribution substation towards outdoor shall be Grade C fire door;

8.3.3 Diesel generator room shall comply with the following requirements:

1 Position selection and other requirements of diesel generator room shall comply with requirements in Clause 8.3.1 in this code;

2 Diesel generator room shall be provided with generator room, control and distribution room, oil storage room and spare parts storage room; above-mentioned rooms can be properly combined, added or cut down based on practical conditions;

3 Two exits shall be set between generators, and one of the exist shall be large enough to meet requirements of machine set transportation, or hoisting hole shall be left;

4 Door of exit between generators shall be opened outward; firefighting measures shall betaken for door and observation window between generator room and control room or distribution substation, and the door shall be opened towards generator room;

5 Diesel generator set shall be set adjacent to first class load or distribution substation;

6 Diesel generator room can be located at the first storey or underground storey one of high-rise building annex, and shall comply with the following requirements:

1) Diesel generator room shall be separated from other parts by partition wall with fire endurance no less than 2h or 3h, floor slab with fire endurance no less than 1.50h and Grade A fire door;

2) Oil storage room shall be set in diesel generator room with total storage amount not exceeding 8-hour quantity demanded, and the oil storage room shall be separated from generator room by fire-protecting wall; automatically close Grade A fire door shall be set when door is necessary for fire-protecting wall;

3) Automatic fire alarm system and automatic fire extinguishing system shall be set;

4) When diesel generator room is set at underground storey one, at least one side of the room shall be close to outer wall with warm-air pipe and fume flue extended out of the room. Fume flue setting shall satisfy requirements of environmental protection;

7 Air inlet of diesel generator shall be set opposite to generator end or along both sides of generator end;

8 Comprehensive measures combined unit noise elimination with machine room sound isolation shall be adopted for diesel generator room.

8.3.4 Intelligent system machine room shall comply with the following requirements:

1 Machine rooms of intelligent system include: fire control room, security supervision center, telecommunication machine room, satellite receiving and cable television room, computer room, building appliance supervision room, cable casting and (hall) microphone room;

2 Machine rooms of intelligent system can be either independently or combined set, and shall comply with the following requirements:

1) Setting of fire control room and security supervision center shall comply with relevant firefighting and security specifications;

2) Fire control room and security supervision center shall be set in the first storey or underground storey one of buildings, and shall be separated from other parts by partition wall with fire endurance no less than 2h or 3h and floor slab with fire endurance no less than 1.50h or 2h. In addition, safety exit directly towards outdoor shall be set;

3) When firefighting control room is used together with other control rooms, independent working space shall be left for firefighting equipments, and no disturbance between them shall be generated;

4) When security supervision center is used together with other controlrooms, risk classification shall be identified by security competent department.

5) Overhead floor, net floor, or floor wire casing shall be laid for machine room of intelligent system; anti-static and dust-proof materials shall be adopted; clear height of machine room shall be no less than 2.50m;

6) Indoor temperature of machine room shall be respectively no less than 18°C and no more than 27°C in winter and summer; indoor relative humidity shall be respectively more than 30% and less than 65% in winter and summer;

7) Machine room of intelligent system shall not be set under or adjacent to toilet, bath room or other places usually covered with water;

3 Important machine room of intelligent system shall be kept away from strong magnetic field;

4 Positions and pathway for lines laying shall be left in preliminary design for equipment room of intelligent system;

5 Materials protection and technology protection shall be carried out for important machine room of intelligent system;

6 Lightning proof measures shall be taken according to systemic risk assessment of intelligent system with equipotent bonding;

8.3.5 Electrical shaft and intelligent system shaft shall comply with the following requirements:

1 Clear width of electrical shaft in high-rise building shall be no less than 0.80m when passageway is utilized as its maintenance area;

2 Clear width of intelligent system shaft in high-rise building shall be no less than 0.60m when passageway is utilized as its maintenance area; clear width of intelligent system shaft in multistoried building shall be no less than 0.35m when passageway is utilized as its maintenance area;

3 Lighting outlet as well as emergency illumination light shall be left in electrical shaft and intelligent system shaft, and control switch shall be mounted out of shaft;

4 Electrical shaft and intelligent system shaft shall be set separately, and their terrace or doorsill shall be 0.15~0.30m higher than terrace of the storey;

5 Noncombustible materials with fire endurance no less than 1h shall be adopted for shaft wall of electrical shaft and intelligent system shaft, and fire wall no less than Grade C shall be adopted for maintenance wall;

6 Environmental indices in electrical shaft and intelligent system shaft shall be able to guarantee good running of equipments.

8.3.6 Line laying shall comply with the following requirements:

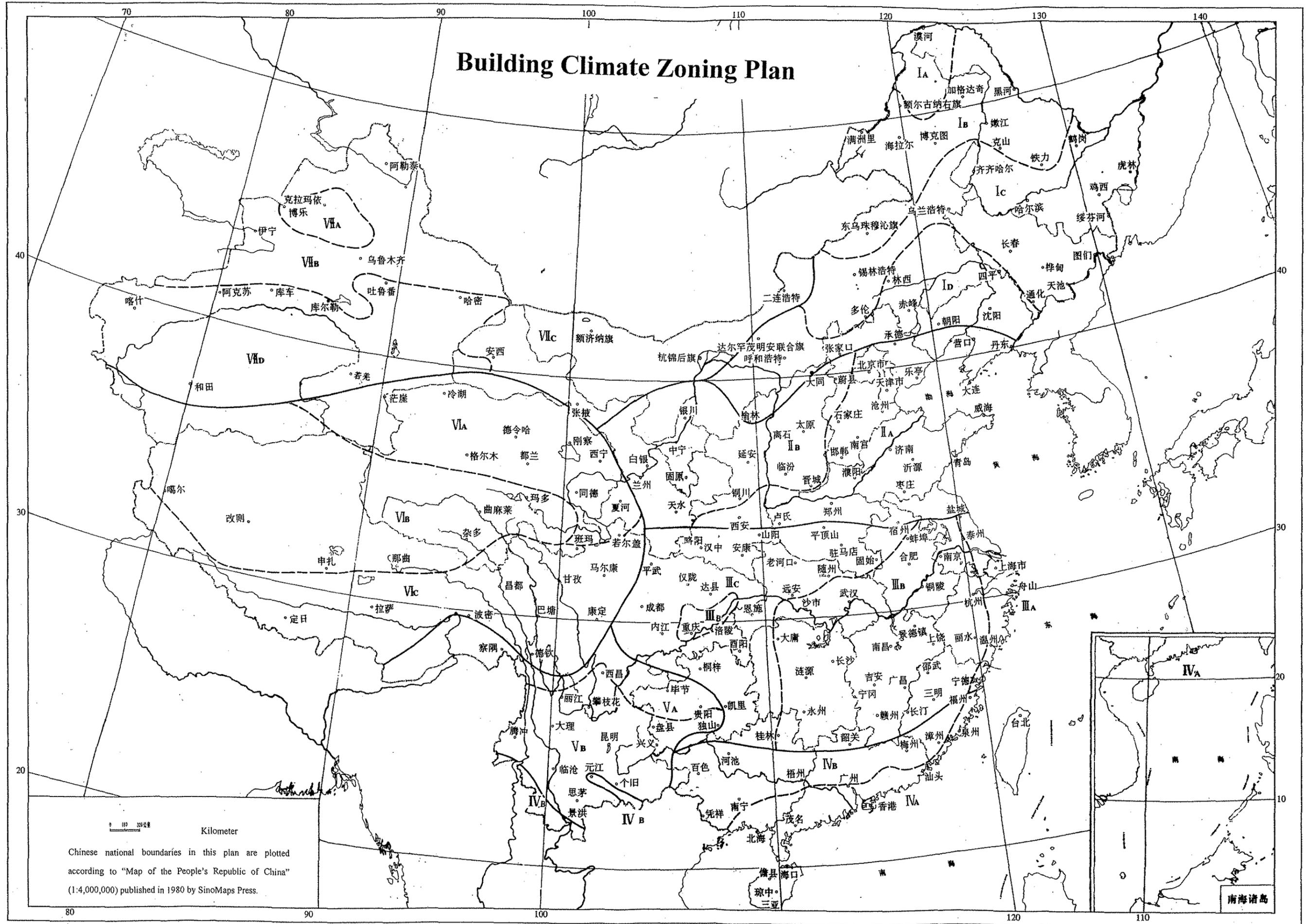
1 Line laying shall comply with regulations in current national standard "Code of Acceptance of Construction Quality of Electrical Installation in Building" GB50303;

2 Cable of intelligent system shall be passed through metal pipe or laid in metal wire casing;

3 Protective pipe cover of cables laid in floor slab, wall body and column (except for cable wire with fire-proof requirements) shall be no less than 15mm;

4 Thickness of floor slab and storey height of building shall meet required space for horizontal laying of heavy electricity cable and intelligent system cable, as well as colligation with other professional pipe.

Building Climate Zoning Plan



0 100 200 Kilometer

Chinese national boundaries in this plan are plotted according to "Map of the People's Republic of China" (1:4,000,000) published in 1980 by SinoMaps Press.

南海诸岛

Terminology Explanation for This Code

1 In order to differentiate terminologies during execution of this code, words of different requirements in strict degree are explained as follow:

1) Words to express very strict, or it has to be done:

“Must” and “mustn’t” are adopted as positive and negative words, respectively.

2) Words to express strict, or it is done in this way under normal conditions:

“Shall” and “shall not” or “not allowed” are adopted as positive and negative words, respectively.

3) Words to express slightly selective, or it is done in this way firstly if conditions permitted:

“Ought to” and “ought not to” are adopted as positive and negative words, respectively.

“Can” is adopted to express selective, and it is able to be done in this way under certain conditions.

2 When it shall be executed according to other standards or specifications indicated in this Code, its writing style: “shall comply with regulations of ...” or “shall be executed according to...”