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Uniform standard for design of civil buildings

民用建筑设计统一标准

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Uniform standard for design of civil buildings

1 General provisions

1.0.1 In order to meet the "applicable, economic, green and beautiful building" principles for civil buildings, to meet the basic requirements of safety, sanitation and environmental protection, and to unify the general design requirements of various civil buildings, this standard is prepared.

1.0.2 This standard is applicable to the design for new construction, extension and renovation of civil building.

1.0.3 In addition to the implementation of relevant national laws and regulations, civil building design shall also meet the following requirements:

1 The relationship between people, architecture and the environment shall be properly addressed in accordance with the principles of sustainable development.

2 Ecological environment must be protected to prevent environment pollution and destruction.

3 People orientation shall be adopted to meet the physical and spiritual needs of people.

4 Basic national policies of saving land, energy, water and raw materials shall be implemented.

5 The design shall meet the requirements of the local urban and rural planning and coordinate with the surrounding environment. It should reflect the regional culture and times features.

6 As for the building and environment, the disaster prevention safety measures such as fire prevention, earthquake resistance, flood prevention, air defense, wind, snow and thunder resistance shall be adopted comprehensively.

7 Barrier-free (accessible) facilities shall be provided in indoor and outdoor environments to facilitate the use of handicapped people.

8 All construction involving famous historical and cultural cities, towns, villages, historical and cultural blocks, cultural relics protection units, historical buildings, scenic spots and natural reserves shall comply with the provisions of relevant protection

2 Terms

2.0.1 civil building
the general term of the building for people living and public activities

2.0.2 residential building
building for people to live and use

2.0.3 public building
building for people to conduct various public activities

2.0.4 accessibility facilities
service facilities to ensure safe passage and convenient use of personnel, and to be constructed in conjunction with civil construction projects.

2.0.5 construction site
site for the construction project, which is determined according to the nature of the land and the use of ownership

2.0.6 boundary line of roads
boundary line of land for urban roads (including residential area roads)

2.0.7 property line
boundary line for the land use rights of various types of construction projects

2.0.8 building line
boundary line that the planning administrative department separately defines and the main body of a building (structure) above the ground shall not extend beyond within the boundary line of roads and construction land boundary

2.0.9 building density; building coverage ratio
the ratio (%) of the total area of the foundation of the building to the total land area within a certain land area

2.0.10 plot ratio; floor area ratio
the ratio of the total area of the building to the area of the land within a certain land use and floor use range

2.0.11 greening rate
the ratio (%) of the total area of various types of green space to the total area of the land (%) within a certain land use area

2.0.12 insolation standard

2.0.22 ramp

ramped traffic passage for pedestrians and vehicles connected to indoors or outdoors floors or grounds of different elevations

2.0.23 railing

protective partitioning member for securing personal safety or separating spaces with a certain safety height

2.0.24 stair

building component consisting of steps for continuous walking, rest platforms, and rails for safety maintenance rails (or breast board), and corresponding support structures and for vertical traffic between floors

2.0.25 deformation joint

structural joint preserved to prevent the building from being exposed to external factors, additional deformation and stress generated inside the structure which causes to be cracked, collided or even destroyed, including expansion joints, settlement joints and anti-seismic joints

2.0.26 building curtain wall

building peripheral retaining wall consisting of the panel and the supporting structural system (supporting device and supporting structure), which can have a certain displacement capacity relative to the main body structure or has a certain deformation capability, and does not bear the action of the main structure

2.0.27 suspended ceiling

ceiling suspended under the roof or slab structure of the house

2.0.28 pipe shaft

vertical hoist-way in a building for arranging vertical equipment pipeline and equipment

2.0.29 smoke uptake; smoke flue

pipes and shafts that emit various flue gases

2.0.30 air shaft

pipelines and shafts that exhaust indoors bad gas or transmit fresh air

2.0.31 decoration; finishing

detailed processing and artistic processing of the interior and exterior spaces of the building based on the main structure of the building

2.0.32 daylighting

measures to make natural illuminance obtained for the space inside the building meets the requirements of use, safety, comfort, and aesthetics, in order to ensure that the living,

4 Planning control

4.1 Urban planning and city design

4.1.1 Control indicators such as the land use nature, plot ratio, building density, greenbelt rate, building height of for construction projects and annual runoff total control rate of its construction base shall conform to the relevant provisions of the local controlled detailed planning.

4.1.2 Architecture and its environmental design shall meet the requirements of the urban / rural planning and the urban design in the respect of the control and guidance on the local target orientation, spatial form, landscape and environmental quality, and shall meet the design control requirements of urban design for public space, architectural groups, landscape, municipal and other environmental facilities.

4.1.3 Architectural design shall be stressed in the integration and coordination of architectural group space and natural landscape environment, the protection and development of historical culture and traditional features, the organization and shaping of public activities and public space, and shall meet the following requirements:

1 The shape, volume, scale, color and spatial combination of buildings shall be coordinated with the surrounding spatial environment;

2 The architectural style, height and interface, etc. of buildings in the important interface control section of cities shall be coordinated with the buildings in the adjacent building bases.

3 The construction site, green planting, landscape structures and environmental embellishment, municipal engineering facilities, landscape lighting, marking system and public art within the construction base shall be designed and coordinated with the buildings and their environment.

4 Permeable pavement should be adopted for roads, parking lots and hard ground in the construction base:

5 The outdoor open space and walking system of the building base and adjacent building base buildings should be connected with each other.

4.2 Construction base site

4.2.1 The construction base shall be adjacent to urban roads or township roads, otherwise, connecting roads shall be set up and shall meet the following requirements:

entrances and exits shall not be set within 70.0m from the red line intersection of roads.

2 The nearest edge line from pedestrian crossing, pedestrian overpass and pedestrian underpass (including approach roads and approach bridges) shall not be less than 5.0m;

3 The distance from the subway entrance, public transportation platform edge shall not be less than 15.0m;

4 The distance from the nearest edge of the entrance and exit of parks, schools and buildings used by children, the elderly and the disabled shall not be less than 20.0m.

4.2.5 Bases for building like large and oversize transportation, culture, sports, entertainment, commerce and other densely populated construction shall meet the following requirements:

1 The total length of the building base adjacent to the urban roads shall not be less than 1/6 of the perimeter of the building base;

2 The number of entrances and exits of the construction base shall not be less than 2 and they should not be set on the same urban road.

3 In front of the main entrance and exit of the building, a personnel distribution site shall be set up, and its area and length and width shall be determined according to the nature of use and the number of people.

4 If greening, parking or other structures are set up in the construction base, there shall be no obstacle to the distribution of personnel.

4.3 Building surface eruption

4.3.1 Except for arcade buildings, building connection, subway-related facilities and municipal public facilities such as pipelines, pipe trenches and pipe corridors connecting cities, buildings and the following ancillary facilities shall not be built in a way that protruding out of boundary line of roads or property line:

1 Underground facilities, shall include supporting piles, underground diaphragm wall, basement floor and its foundation, septic tanks, all kinds of pools, treating pond, settling pond and other structures and other ancillary facilities, etc.:

2 The above-ground facilities shall include porch, corridor, balcony, outdoor staircase, bay-window, air conditioning unit, awning, overhanging eaves, decorative framework, fixed sunshade, steps, ramp, framed flower bed, wall, platform, water apron and open trench, basement air inlet and outlet, basement entrance and outlet, water-collecting well, light well, chimney, etc.

5 Site planning

5.1 Architectural composition

5.1.1 The architectural composition shall enable the rational shunt of people, traffic and logistics in the building base to prevent interference of them, and shall be conducive to firefighting, parking, personnel distribution and accessibility facilities.

5.1.2 Building interval shall meet the following requirements:

1 Building interval shall meet the requirements of the current national standard GB 50016 *Code for fire protection design of buildings* as well as the local urban planning requirements;

2 Building interval shall meet the requirements of natural lighting for building houses in Subclause 7.1 of this Standard, and the building and site with sunshine requirements shall meet the requirements in the relevant insolation standards of the country.

5.1.3 Architectural composition shall prevent and resist disasters such as cold, summer heat, high winds, heavy rain, snow and dust according to the regional climate characteristics, and ventilation by using natural air flow shall be used to prevent adverse microclimate.

5.1.4 According to the location, direction and intensity of noise sources, comprehensive measures in building functional zoning, road layout, building orientation, distance, terrain, greening and barrier function of buildings shall be taken to prevent or reduce environmental noise.

5.1.5 Sanitary distance between buildings and different pollution sources shall conform to the requirements of the current relevant sanitary standards of the country.

5.1.6 Architectural composition shall ensure the protection of cultural relics and ancient and famous trees to avoid damage in accordance with relevant national and local regulations.

5.2 Road and hard standing

5.2.1 Base roads shall meet the following requirements:

1 Speed limit facilities shall be set up on the vehicle road at the junction of the base road and urban road, and the roads shall be accessible to the safety exit of the building;

2 Walkways accessible to streets and inner yard shall be built for the building along the

garage and the connecting road within the construction base. The buffer section shall start from the hillslope of the garage entrance / exit ramp and meet the following requirements:

1 The turning radius of the entrance / exit buffer section and the connecting roads within the base should not be less than 5.5 m;

2 If the entrance / exit is perpendicular to the base road, the buffer section shall not be less than 5.5 m in length;

3 If the entrance / exit is parallel to the base road, the entrance / exit has a buffer section not less than 5.5 m in length before accessing the base road;

4 When the entrance /exit is directly connected to the urban road outside of the base, its buffer section should not be less than 7.5 m in length.

5.2.5 Outdoor motor vehicle hard standings shall meet the following requirements:

1 Parking lot shall meet the drainage requirements, and its drainage slope shall not less than 0.3%;

2 The entrance / exit of a hard standing shall be designed in a way to avoid crossed vehicle travel;

3 A hard standing shall have accessible parking spaces, and their requirements and number shall meet the current national standard GB 50763 *Codes for accessibility design*;

4 Reasonable vegetation with trees for sunlight shading shall be designed for hard standings.

5.2.6 The quantity of entrances / exits for outdoor motor vehicle hard standing shall meet the following requirements:

1 If the number of parked vehicles is 50 and below, one entrance / exit may be set up and it should have the two-way travel function;

2 If the number of parked vehicles is 51 to 300, two entrances / exits shall be set up and they should have the two-way travel function;

3 If the number of parked vehicles is 301 to 500, two entrances / exits shall be set up with the two-way travel function;

4 If the number of parked vehicles is more than 500, three entrances / exits shall be set up and they should have the two-way travel function;

ground drainage.

5 The design elevation of the site should be more than 0.2 m higher than the level of the lowest municipal road section surrounding this site; if the municipal road elevation is higher than the base elevation, the measures shall be taken to prevent foreign water from entering the base.

6 The design elevation of the site shall be higher than the highest multi-year underground water level.

7 As for a base with a large area or more complex terrain, its architectural composition shall make the amount of earth and stone works minimized by reasonable use of the terrain and make a balance between filling and excavation.

5.3.2 The road design slope within the building site shall meet the following requirements:

1 The longitudinal gradient of the motor vehicle road in the base shall not be 0.3% ~ 8%; if the slope is larger than 8%, the slope length shall not be higher than 200.0 m. If the slope gradient is smaller than 0.3% in case of special difficulty, effective drainage measures shall be taken; on special sections, the slope gradient shall not be larger than 11%, and its length shall not be larger than 100.0 m; in snow or frozen areas, the slope gradient shall not be larger than 6%, and its length should not be larger than 350.0 m; the transverse gradient should be 1% to 2%.

2 The longitudinal gradient of non-motor vehicle road in the base shall not be smaller than 0.2%, and its maximum longitudinal gradient should not be larger than 2.5%; in a difficult case, it shall not be larger than 3.5%; for a maximum longitudinal gradient of 3.5%, the slope length shall not be larger than 150.0 m; the transverse gradient should be 1% ~ 2%.

3 The longitudinal gradient of the base walkway shall not be 0.2% ~ 8%, on the snow or frozen area, it shall not be greater than 4%; the transverse gradient shall be 1% to 2%; step walk shall be built if it is greater than the limit gradient.

4 Accessible passage shall be set up in the main areas where the crowd flows within the base.

5 The designed longitudinal gradient of the road in the base in a mountainous or rolling region may be relaxed and shall meet the requirements of relevant local standards or be approved by local relevant authority.

5.3.3 The surface drainage for construction site shall meet the following requirements:

on soil, comprehensive pipelines, loading of landscape and plant growth.

3 Water-proofing structure for building shall be root penetration resistant.

5.5 Layout of pipeline engineering

5.5.1 Pipelines should be laid underground; the engineering pipelines laid overhead and the facilities for them must meet the requirements of fire-fighting vehicle transit and rescue, not interfering with the normal activities of ordinary vehicles and pedestrians, and avoiding the impact on buildings and landscapes.

5.5.2 For the engineering pipeline connected with the municipal pipe network, its plane position and vertical elevation shall be designed based on the unified urban coordinate and elevation systems.

5.5.3 The laying of the engineering pipeline shall not affect the safety of the building and prevented from damages due to corrosion, subsidence, vibration, external load, etc.

5.5.4 Comprehensive layout of pipelines shall be taken according to the characteristics and requirement of them, and integrated pipe gallery should be used. Pipelines with the requirements on safety, hygiene and interference protection shall not be laid on the same ditch or in a close way. The pipelines with mutual interference shall be in different ditches (rooms) of the comprehensive pipe gallery.

5.5.5 The direction of the underground engineering pipelines should be parallel or vertical to the main direction of road or building. Pipelines shall be laid at a depth from shallow to deep in the direction from building to road. Main pipes should be arranged on a side of major user or a side with relatively more branches; engineering pipelines shall be laid with smaller length and less turning, avoiding crossing with road, railway, river course, trench and other pipelines; in a difficult case, the crossing angle shall not be less than 45°.

5.5.6 The pipelines parallel to a road should not be arranged under car lane; if needed, the pipelines with larger depth of burial and less renovation may be laid under car lane.

5.5.7 The horizontal and vertical clear distance and burial depth of the engineering pipelines, and the horizontal clear distance between the engineering pipelines and the building (structure) and greening trees shall meet the requirements of the relevant national standards. If it is difficult to meet the requirements due to the planning and the restriction by the current situation, the minimum horizontal clear distance may be reduced properly upon the safety measures are taken.

5.5.8 Outdoor engineering pipelines in the regions with a seismic precautionary intensity of 7 degree and above, permafrost regions, cold regions, collapsible loess regions and expansive soil regions shall meet the requirements of relevant national standards.

6 Architecture design

6.1 Determining of rate number of users

6.1.1 For the building indicating the number of users like the number of user seats, the width of the supporting facilities, exit passageways, stairs and safety exits shall be calculated based on the rate number of users.

6.1.2 For the building indicating no rate number of users, the reasonable number of users shall be determined according to the current relevant national standards or through investigation and analysis, and based on this value, the width of supporting facilities, exit passageways, stairs and safety exits shall be calculated.

6.1.3 If various places in a multi-functional public building share the same exit at the same time, the width of the safety evacuation exits and the evacuation stairs shall be calculated according to the accumulative number of users at all the places in the horizontal direction. In the vertical direction, for over-ground construction, the width of safety evacuation stairs on the floors below the one with the largest number of users shall be calculated based on the floor with the largest number of users, while for underground construction, the width of safety evacuation stairs on the floors above the one with the largest number of users shall be calculated based on the floor with the largest number of users.

6.2 Layout design

6.2.1 The layout of the building shall be made proper and flexible in consideration of the building use nature, function, process and other factors.

6.2.2 Based on the function of the building, the natural conditions like solar radiation, lighting, ventilation and landscape shall be made good use with respect to the use space. Interference of sight line shall be prevented for the rooms with privacy requirements.

6.2.3 Building entrance / exit shall be set according to the requirements on site conditions, building functions, traffic organization, safety evacuation and others.

6.2.4 The layout design of building in seismic region should be neat.

6.3 Storey height and interior clear height

6.3.1 Building storey height shall be determined by use function, technological requirements, technical and economic conditions of building and other factors, and meet the requirements of current relevant national standards for building design.

buildings.

6.4.7 Habitable room shall not be arranged in basement; if habitable rooms are arranged in the semibasement, the measures must be taken to make them meet the requirements on lighting, ventilation, solar radiation, moisture, mildew, security and other aspects.

6.5 Equipment floor, refuge storey and open floor

6.5.1 Layout of equipment floor shall meet the following requirements:

1 Clear height of equipment floor shall be determined according to the demands on installation and maintenance of equipment and pipelines;

2 Layout of equipment floor shall facilitate the access and maintenance for the equipment;

3 Equipment rooms with mutual influence in safety and hygiene shall not b adjacent to each other.

4 Effective measures shall be taken to prevent vibration and noise adversely affecting the device on the equipment floor or adjacent upper and lower use space;

5 The equipment layer shall be naturally or mechanically ventilated.

6.5.2 Refuge storey shall meet the requirements of the current national standard GB 50016 *Code for fire protection design of buildings* as well as the following requirements:

1 On the precondition that the refuge storey meets the refugee area, other areas out of the refugee area may be doubled as equipment room or others, but the functional areas shall be kept relatively independent and meet the requirements on fire prevention, vibration, sound insulation and other aspects;

2 Clear height of refuge storey shall not less than 2.0 m. If the refuge storey has other functions, its clear height shall be determined according to the required function space.

6.5.3 Clear height of open floor with normal activities shall not be less than 2.0 m.

6.6 Bathroom

6.6.1 Location of bathroom shall meet the following requirements:

1 According to the function, the bathroom shall be arranged in a way that they are convenient, relatively hidden, and avoid the effects of the odor, humidity, noise or interference generated on other rooms. The service radius of indoor public toilets shall

8 The clear distance from one-sided toilet stall to the outer edge of the opposite urinal or tank shall not be less than 1.1 m if the stall is open-in and not less than 1.3 m if it is open-out; the clear distance between the outer edges of urinals or tanks shall not be less than 1.3 m (the minimum depth of the urinal is 350 mm) if they are arranged on two sides.

9 The net distance from the long side of the bathtub to the opposite wall surface shall not be less than 0.65 m; the net width of the short side of the accessible tub bath room shall not be less than 2.0 m, and a seat shall be arranged at one end of the bathtub which is convenient to enter and use, and its depth shall not be less than 0.4 m.

6.6.6 Baby-care room shall be set up in buildings in traffic terminals, highway service stations, hospitals, large and medium-sized shops, exhibition buildings, equivalent public places; and they should be set up in the working places like office building. Baby-care room shall meet the following requirements:

1 Baby-care room shall be a separate room and its area should not be less than 10.0 m^2;

2 Baby-care room shall be arranged with wash basin, baby diaper, tables, chairs and other necessary furniture;

3 The flooring of the baby-care room shall be paved with non-slip material.

6.7 Step, ramp and railing

6.7.1 The arrangement of steps shall meet the following requirements:

1 The tread width of indoor and outdoor steps for a public building should not be less than 0.3m, and the tread height should be no more than 0.15m and no less than 0.1m;

2 Anti-skid measures shall be taken for treads;

3 The tread number of indoor steps should not be less than 2, if the elevation difference is less than 2 treads, it should be built as a ramp;

4 If the total height of the steps exceeds 0.7 m, the protective measures shall be taken on the free-face side;

5 The arrangement of steps of the steps of longitudinal aisle at amphitheaters, stadiums and theater audience hall shall meet the requirements of the relevant national standards.

6.7.2 The arrangement of ramps shall meet the following requirements:

6.8 Stairs

6.8.1 The number and location of stairs, the clear width of flights and the form of staircases shall meet the requirements on use convenience and evacuation safety.

6.8.2 If handrails are arranged on a side, the clear width of flight shall be the horizontal distance from the wall decoration surface to the handrail central line. If handrails are arranged on both sides, the net width of flight shall be the horizontal distance between the central lines of the handrails on both sides. If there is a projection, the clear width of flight shall be calculated from the surface of the projection.

6.8.3 The clear width of flights shall meet the requirements of GB 50016 *Code for fire protection design of buildings* and the relevant national special standards for building design. Besides conforming to the requirements above, the net width of flights of the stairs for daily travel shall be determined by the number (not less than two) of the pedestrian flows [the width of each pedestrian flow is 0.55 m + (0-0.15) m, where (0-0.15) m is the swing of human body in movement] according to the use characteristics of the buildings. The upper limit value of shall is used for the places where there are a lot of people in a public building.

6.8.4 If a flight has direction change, the minimum width of platform at handrail turning end shall not be less than the clear width of flight and 1.2 m. If there is a need to carry large objects, it shall be broadened appropriately. The width of the middle platform of the direct stairs shall not be less than 0.9 m.

6.8.5 The number of treads on each flight shall not be less than 3, and not more than 18.

6.8.6 The clear height of upper and lower passageways of stairway platform shall not be less than 2.0 m, and the clear height of flight shall not be less than 2.2 m.

Note: The clear height of flights is the vertical height from the front edge of the tread (including the scope 0.3 m beyond the front edge lines of the lowest and highest treads) to the lower edge of the protrusion above.

6.8.7 At least one side of the stair shall be equipped with handrails; if the clear width of the flight contains three pedestrian flows, two sides of the stair shall be equipped with handrail, and if it contains four pedestrian flows, the middle handrail should be added.

6.8.8 The handrail height of indoor stairs should not be less than 0.9 m from the front edge line of tread. If the length of horizontal railing or sideboard for stairs is more than 0.5 m, the railing height shall not be less than 1.05 m.

6.8.9 At nursery, kindergarten, middle and elementary schools, and other special activity

be surrounded by stairs;

9 Elevator shafts and machine rooms should not be placed adjacent to the rooms with quiet requirements, otherwise vibration insulation and sound insulation measures shall be taken;

10 Elevator machine room shall be equipped with measures such as thermal insulation, ventilation, dust prevention, etc. and should be equipped with natural daylighting, and the roof of the machine room shall not be used as the baseplate of the water tank and directly cross the water pipe or steam pipe in the machine room;

11 The arrangement of fire elevators shall meet the relevant requirements of the current national standard GB 50016 *Code for fire protection design of buildings*;

12 The passenger elevators of buildings for the elderly and disabled people shall be equipped with a monitoring system. The elevator door should be equipped with a visual window, and shall meet the relevant requirements of the current national standard GB 50763 *Code for accessibility design*.

6.9.2 Escalators and moving walkways shall meet the following requirements:

1 The escalators and moving walkways shall not be the emergency exit;

2 The width of the unobstructed area at the entrance and exit shall not be less than 2.5 m from the end of the handrail belt, and the width of the unobstructed area of the densely public places should not be less than 3.5 m;

3 The protective railings or fences shall be provided between the escalator and the opening of the floor.

4 The fences shall be flat, smooth and free of protrusions; the vertical height of the top surface of the handrail belt from the leading edge of the escalator, the pedal surface or the tape surface of moving walkways shall not be less than 0.9 m.

5 The distance between the center line of the handrail and the parallel wall or the opening edge of the floor: when arranged with adjacent, parallel and cross, the horizontal distance between the center lines of the handrail belts between the two escalators (walkways) shall not be less than 0.5 m, otherwise measures shall be taken to prevent obstructions from injuring personal.

6 The vertical clear height of steps of the escalator and the pedal or the tape of the moving walkway shall not be less than 2.3 m.

7 The inclination angle of the escalator should not exceed 30°, its rated speed should

2 When the indoor wall needs moisture proofing , the positive side shall be provided with a moisture-proof layer; when the indoor wall surface needs water proofing, the positive side shall be provided with a water-proof layer;

3 The material used in the moisture-proof layer shall not affect the overall anti-seismic property of the wall;

4 When the indoor wall needs anti-fouling and anti-collision, the dado shall be set according to the application requirements;

5 The waterproof and drainage structure measures shall be taken for the exterior sill;

6 The dummy plate for outdoors machine of the air conditioner on the exterior wall shall be provided with good drainage of condensed water, and with the structure measures for preventing rainwater pouring and exterior wall moisture-proofing.

7 The position of the outdoor machine of air-conditioner on the exterior wall shall be easy to install and repair.

6.10.4 The reinforcement measures shall be taken to prevent deformation joint at the openings, doors and windows of the exterior wall.

6.10.5 The deformation joints include expansion joints, settlement joints and anti-seismic joints. Their arrangements shall meet the following requirements:

1 The deformation joints shall be designed according to the nature and conditions of the joints so that they are unobstructed in the event of displacement or deformation and do not damage the building.

2 According to the requirements of building use, the structural measures such as waterproofing, fireproofing, heat preservation, sound insulation, anti-aging, anti-corrosion, anti-pest and anti-shedding shall be taken for the deformation joint;

3 Deformation joints shall not pass through water-using rooms such as toilet, bathroom, washroom and shower room, and the rooms where water leakage is strictly prohibited such as power distribution room.

6.11 Door and window

6.11.1 The selection of doors and windows shall be comprehensively determined according to the climatic conditions and energy-saving requirements of the area where the building is located, and shall meet the requirements of the national current standards for building doors and windows.

1 Skylights shall be made of light transmissive materials that prevent injuring people due to breaking;

2 Measures to prevent condensation water production or leak condensation water shall be taken for the skylight, and in snowy areas, the impact of snow on the skylight shall be considered;

3 Skylight shall be equipped with facilities to facilitate cleaning and maintenance.

6.11.9 Arrangement of door shall meet the following requirements:

1 The door shall be easy for opening, sturdy and durable;

2 The manually opened door leaf shall be equipped with braking device, and anti-derailment measures shall be taken for the sliding door;

3 Double-sided spring door shall be installed with transparent safety glass at the visible height;

4 The sliding doors, revolving doors, electric doors, roller shutter door, hanging doors and folding doors shall not be used as evacuation doors;

5 The full opening of door leaf to the evacuation walkway and stairwell shall not affect the evacuation width of the walkway and the stair platform;

6 The full glass doors shall be made of the safety glass or equipped with protective measures and anti-collision warning signs;

7 The opening of the door shall not span the deformation joint;

8 With a foyer, the distance between the two doors shall not be less than 0.8 m when the door leaf is opened at the same time; in case of accessibility requirement, they shall meet the requirements of the current national standard GB 50763 *Codes for accessibility design*.

6.12 Building curtain wall

6.12.1 The types of building curtain wall shall be properly selected in consideration of geography, climate, environment, use functions and height and other factors of the area where the building is located.

6.12.2 The structural type, supporting materials, structure of building curtain wall shall be selected properly based on different panel materials.

6.15.4 Suspension of the suspended ceiling and main structure shall be provided with safety structure measures. Equipment with heavy objects or vibration shall be directly suspended on the load-bearing structure of building, and structural calculation shall be carried out to meet the requirements of the current relevant standards; when the length of suspended rod is greater than 1.5 m, steel structure support frame or counter support should be provided.

6.15.5 The suspended ceiling system shall not be suspended on equipment pipelines or facilities in the suspended ceiling.

6.15.6 Suspended ceilings with more pipelines shall meet the following requirements:

1 Reasonable arrangement of various equipment pipelines or facilities shall comply with the national current fireproof, safety and related professional standards;

2 The accessible suspended ceiling shall meet the requirements of pedestrian and maintenance loads, and be reserved with maintenance space. If necessary, a maintenance access (packway) and a manhole for easy access to the suspended ceiling shall be set;

3 The inaccessible suspended ceiling should be provided with assembled ceiling panel that is easy to disassemble or the manholes should be set at the required location.

6.15.7 When water lines are installed in the suspended ceiling, measures shall be taken to prevent condensation water.

6.15.8 For suspended ceiling in wet rooms or environments, measures with waterproof or moisture proof and anti-condensation, dripping and condensation water discharging shall be taken; cast-in-place slabs should be used for reinforced concrete roofs.

6.16 Piping shaft, flue and air shaft

6.16.1 Pipe shaft, flue and air shaft shall be made of non-combustible materials and set separately and shall not be shared.

6.16.2 Arrangement of pipe shaft shall meet the following requirements:

1 Pipelines with mutual an impact on safety, fireproofing and sanitation shall not be laid in the same pipe shaft.

2 The cross-section dimension of the pipe shaft shall meet the requirements for the pipeline installation and maintenance space. When wall-mounted equipment is installed in the shaft, the shaft wall shall meet the requirements of load bearing and installation.

7 Indoor environment

7.1 Lighting environment

7.1.1 The daylighting calculation of main function rooms in buildings shall meet the requirements of current national standard GB/T 50033 *Standard for daylighting design of buildings*.

7.1.2 The daylighting of the bedroom and living room (hall), of the residential building and the general ward of the medical building shall not be lower than the Grade IV of standard value of daylight factor. The daylighting of the ordinary classroom of the educational building shall not be lower than Grade III of standard value of daylight factor and the daylighting calculation shall be carried out. The daylighting shall meet the following requirements:

1 Each residential building shall have at least one living space meeting the requirements of standard value of daylight factor. When the total number of living spaces in a residential building exceeds four, two and above spaces shall meet the requirements of the daylight factor standard;

2 The residential buildings for the aged and the main function rooms of kindergartens shall have an area of not less than 75% meeting the requirements of standard value of daylight factor.

7.1.3 The calculation of the effective daylighting window area shall meet the following requirements:

1 When daylighting at side, the part of the daylighting opening of the civil building below 0.75 m from the ground shall not be included in the effective daylighting area;

2 The external shelters such as cornice, decorative panels, fireproof passages and balconies on the upper side of the side window daylighting opening shall be calculated according to the actual shelters during daylighting calculation.

7.1.4 The quantity and quality indexes of building lighting shall meet the requirements of the current national standard GB 50034 *Standard for lighting design of buildings.* The lighting assessment index of each place shall meet those specified in Table 7.1.4.

buildings shall be provided with effective measures to prevent the occurrence of wind whistling.

7.4.3 The vibration insulation and noise reduction design of building equipment in civil buildings shall meet the following requirements:

1 The low-noise products should be selected for the building equipment with noise and vibration in the civil building, and shall be arranged in a location that is less disturbing to noise-sensitive rooms. When building equipment with noise and vibration may cause noise interference to noise-sensitive rooms, effective vibration insulation and sound insulation measures shall be taken.

2 All types of pipelines connected to the building equipment generating noise and vibration shall be provided with measures such as hose connection and elastic support and hanger setting to control the spreading of vibration and solid noise along pipeline. Comprehensive measures such as controlling the flow rate and setting the muffler shall be taken to reduce the mechanical radiation noise and airflow regeneration noise spreading along the pipeline.

3 When all kinds of pipelines pass through the walls and slabs of noise-sensitive rooms, the surroundings of the holes shall be sealed and sound-insulated; when the wall detail in the noise-sensitive room are equipped with auxiliary members that are embedded in the wall and can significantly reduce the sound insulation performance of the wall detail, they shall not be arranged back to back and be staggered from each other, and effective sound insulation and sealing measures shall be taken for the opened holes (slots).

7.4.4 Diesel generator room shall be provided with comprehensive control measures for unit noise elimination and machine room sound insulation. The refrigeration room, pump house of heat exchange station and water pump room shall be provided with vibration isolation and noise control measures.

7.4.5 For concert halls, theaters, cinemas, multi-purpose halls, stadiums, terminals and various transportation passenger stations and other important buildings with special acoustic requirements, special design for building acoustics and sound-reinforcement systems should be performed based on functional positioning and usage requirements.

7.4.6 For densely populated indoor places, noise reduction design shall be performed.

taken for the floor and structural slab of the toilet.

8.1.5 The laying of pipes for water supply and drainage shall meet the following requirements:

1 The pipeline for water supply and drainage shall not pass through rooms that water may damage equipment and cause accidents, such as power distribution room, elevator machine room, intelligent system machine room, audio-visual warehouse, as well as the storehouse for collections of museum buildings, the archives storage area of archives buildings and the book storage area of library buildings; the pipeline shall also avoid passing over production equipment, raw materials and products that may cause explosion and combustion when exposed to water, and power distribution cabinets;

2 Horizontal drainage pipelines shall not pass through processing and storage places of food, medicines and their raw materials, and shall not pass directly above the drinking water reservoir (tank);

3 Drainage pipelines shall not pass through structural deformation joints and other parts, if necessary, appropriate technical measures shall be taken.

4 Drainage pipelines must not pass through rooms with stricter requirements of sanitation quietness, like the guest room, bedroom of ward and residence, study, sitting room, dining-room, etc.

5 The drinking water pipeline must not pass through the poison contaminated areas. Safety protection measures shall be taken when it passes through corrosive areas

8.1.6 The distance between septic tank underground water intake structure shall not be less than 30.0 m. The exterior wall of septic tank should not be less than 5.0 m from that of buildings and shall not affect the foundation of the building.

8.1.7 The setting of the sewage treatment station and reclaimed water treatment station shall meet the following requirements:

1 The sewage treatment station and reclaimed water treatment station of the residential district should be set in the downwind of the prevailing wind of the base, and should be set independently underground. The distance between the ground treatment station with domestic sewage as raw water and the public buildings and residences should not be less than 15.0 m.

2 For the reclaimed water treatment station, in the building, it should be set at the lowest floor of the building; in the building complex (group), it should be set in the basement or podium of the central building.

6 The exhaust of the catering kitchen shall be discharged into the outdoor air after being processed and meeting the requirements.

8.2.3 The civil building with the heating, ventilating and air-conditioning system shall meet the following requirements:

1 The choice of air-conditioning cooling and heating sources, systems and operation modes shall be based on the size of the building, the use, the energy conditions of the construction site, structure, price and national policies of energy saving and emission reduction, and environmental protection;

2 The height of floor or ceiling and elevated floor shall meet the installation, cleaning and maintenance requirements of air conditioning equipment and pipelines;

3 Air-cooled outdoor machine shall be set in a well-ventilated position; water-cooling equipment shall not only be well ventilated, but also avoid the adverse impact of drifting water on pedestrians or the environment, and anti-fog and anti-noise measures shall be taken when the machine is close to the outside window.

4 The thermal expansion of air conditioning pipelines and overhaul of concealed equipment shall meet the relevant requirements of Sub-clauses 8.2.1 and 8.2.2 of this standard respectively;

5 The air conditioning room shall be adjacent to the air conditioning area it served. The area and net height of the room shall meet the installation requirements of equipment and air duct, as well as the requirements of perennial cleaning and maintenance.

8.2.4 The installation of HVAC equipment in existing buildings shall not endanger structural safety, and outdoor equipment shall not endanger neighbors or pedestrians.

8.2.5 The setting of the station building of cold and heat sources shall meet the following requirements:

1 The transport passage and condition of the large equipment shall be reserved; lifting facilities shall be provided at the position that is meeting the requirements of height and bearing capacity;

2 Main equipment room should adopt the cement floor, and the base unit of main equipment should be provided open drains;

3 The spaces for access and maintenance around and above the equipment shall be left;

4 The centralized control room shall be set up in the station building that multiple main

outdoor shall be set; when the building area is greater than 200.0 m^2, at least two evacuation doors directly leading to the evacuation passageway (emergency exit) or outdoor shall be set; when the length of the substation is greater than 60.0 m, at least three evacuation doors directly leading to the evacuation passageway (emergency exit) or outdoor shall be set up.

4 If the duty room is set up in the substation, it shall be equipped with an evacuation door leading directly to the outdoor or evacuation passageway (emergency exit).

5 If there are two or more evacuation doors in the substation, the distance between the evacuation doors shall not be less than 5.0 m and greater than 40.0 m.

6 The entrance of the transformer room, power distribution room and capacitor room shall be opened outwards. For substations in the same fire compartment, the internal connecting doors shall be bidirectional swing doors made of non-combustible materials. If the length of the transformer room, power distribution room and capacitor room is greater than 7.0 m, at least two entrances shall be set up.

7 The transformer room, power distribution room and capacitor room shall be equipped with facilities that prevent rain, snow and small animals into the room from daylighting windows, ventilation windows, doors and cable trenches.

8 The ground or threshold of the substation should be higher than the ground of the floor not less than 0.1 m. If the substation is in the basement, its ground or threshold should be higher than the ground of the storey it located not less than 0.15 m Waterproof and drainage measures shall be taken for the cable mezzanine, cable trench and cable room of the substation.

8.3.2 The class of fire door of the substation shall meet the following requirements:

1 The evacuation doors of the substation leading directly to the evacuation passageway (emergency exit) and the doors of the substation leading directly to the non-substation area, shall be Class A fire doors;

2 The evacuation door of the substation leading directly to the outside, shall not lower than Class C fire door.

8.3.3 The diesel generator room shall meet the following requirements:

1 The setting of the diesel generator room shall meet the requirements of Sub-clause 8.3.1 of this standard.

2 The diesel generator room shall be equipped with the generator room, control and power distribution room, oil storage room, spare parts storage room, etc.; the above

8.4.4 The pressure regulator box or special pressure regulating device may be hung on the exterior wall of the residential building with the fire resistance grade not lower than Grade II, and the fire resistance limit of the exterior wall body shall not be less than 2.5 h.

8.4.5 When the inlet pressure of the pressure regulating device is not greater than 0.4 Mpa, and the inlet and outlet pipe diameter of the pressure regulating device is not greater than *DN*100, it may be set on the flat roof of the building that use gas, and shall meet the following requirements:

1 It shall be allowed by the force of roof bearing structure, and the fire resistance limit of the building shall not be lower than Grade II.

2 The horizontal clearance between the pressure regulating box (or open-air pressure regulating device) and the chimney of building shall not be less than 5.0 m.

8.4.6 The setting of gas meter and user voltage regulator, shall meet the following requirements:

1 The gas meter and user voltage regulator shall be set up on the non-combustible wall, and shall be set up at places where is well-ventilated and easy to install, check the meter;

2 The gas meter and user voltage regulator in residential building may be set in the kitchen or in the meter box or meter room outside the door.

3 The gas meters of public buildings shall be centrally arranged in a separate room. When there is a special room for voltage regulator, it may be arranged in the same room with the voltage regulator.

4 The gas meter and user voltage regulator shall not be set up in the pipe shaft with power supply, electrical switches and other electrical equipment.

8.4.7 The underground spaces such as basement and semi-basement shall not be used for the setting of LPG, and metering devices of gas pressure regulating with a relative density greater than 0.75, as well as pipelines, gas appliances, gas-used equipment and other facilities.

8.4.8 When liquefied petroleum gas cylinder group is used for spontaneous vaporization, and the total volume is less than or equal to 1.0 m^3, the cylinder group may be set in a single-storey special room adjacent to the exterior wall of buildings (except high-rise buildings, important public buildings and residential buildings). The single-storey special room shall meet the following requirements:

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