

Foreword

According to the requirements of Document JIANBIAOBIAOHAN [2018] No. 164 issued by the Ministry of Housing and Urban-Rural Development of the People's Republic of China—"Letter of Standard Quota Department of the Ministry of Housing and Urban-Rural Development of the People's Republic of China on conducting the revision of *Assessment standard for green building*", standard drafting group developed this standard through extensive investigation and study, careful summarization of practical experience and reference to relevant foreign standards and on the basis of widely soliciting for opinions.

The main technical contents of this standard are: 1. General Provisions; 2. Terms; 3. Basic Requirements; 4. Safety and Durability; 5. Health and Comfort; 6. Occupant Convenience; 7. Resources Saving; 8. Environment Livability; 9 Promotion and Innovation.

The main technical contents of this standard revision are: 1. reconstructing the technical index system for green building assessment; 2. changing the assessment time of green building; 3. adding the grade of green building; 4. expanding the connotation of green building; 5. improving the performance requirements of green building.

This standard is under the jurisdiction of the Ministry of Housing and Urban-Rural Development of the People's Republic of China, and China Academy of Building Research is in charge of the explanation of technical specifications. In case of opinions and suggestions during implementation, please post them to Department of Standards and Codes, China Academy of Building Research (Address: No. 30, North 3rd Ring East Road, Beijing 100013, China).

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1 General Provisions

1.0.1 This standard is prepared with a view to implement the concept of green development, promote the high-quality development of green building, save resources, protect the environment, and meet the people's growing needs for a better life .

1.0.2 This standard is applicable to the assessment on the green performance of civil buildings.

1.0.3 The assessment of green building shall follow the principle of adapting to local conditions, in consideration of the climate, environment, resources, economy, culture, etc. at the place where the buildings are located, and then make a comprehensive assessment of the buildings in terms of safety and durability, health and comfort, occupant convenience, resources saving and environment livability during the whole life cycle of the buildings.

1.0.4 Green building shall be combined with landforms for site design and building layout, and building layout shall be adapted to the climatic conditions and geographical environment of the site; meanwhile, the wind, light, thermal and acoustic environments of the site shall be considered and used.

1.0.5 In addition to the requirements stipulated in this standard, the assessment of green building shall comply with those stipulated in the current relevant standards of the nation.

2 Terms

2.0.1 Green building

The high-quality building that is able to save the resources, protect the environment and reduce pollution to provide people with a healthy, applicable and efficient space and maximally realize harmonious coexistence with the nature during its whole life cycle.

2.0.2 Green performance

The comprehensive performance of building in terms of safety and durability, health and comfort, occupant convenience, resource saving (land saving, energy saving, water saving and material saving) and environmental livability.

2.0.3 Decorated

Before the delivery, for residential buildings, the interior wall, ceilings and floors are all paved and finished, doors and windows, fixed furniture, equipment pipelines, switch sockets as well as kitchen and bathroom fixtures are installed in place; for public buildings, the fixed surfaces of the sharing spaces are all paved and finished, and the basic equipment such as water, heating, electricity and ventilation are all installed in place.

2.0.4 Heat island intensity

A characterization parameter of the urban heat island effect, by which the differences of the air temperature between one urban area and the suburb area is expressed by the temperature difference between the typical measuring points.

2.0.5 Green building material

The building materials with the characteristics of energy-saving, emission reduction, safety, health, convenience and recyclability, which can reduce the consumption of resources and the impact on the ecological environment during the whole life cycle.

3 Basic Requirements

3.1 General Requirements

3.1.1 Assessment of green building shall take a single building or a group of buildings as the assessed object. The assessment object shall implement and deepen the green development requirements proposed by the statutory planning and related special plans; the assessment indexes involving systemic and holistic characteristics shall be based on the overall project to which the building belongs.

3.1.2 Assessment of green building shall be conducted after the building engineering completed. The pre-assessment may be conducted after the construction drawing design completed.

3.1.3 The applicant for green building assessment shall conduct the technical and economic analysis on the buildings during the whole life cycle, select appropriate technologies, equipments and materials, control the whole process of the planning, design, construction and operation, and submit corresponding analysis and test reports as well as related documents. The applicant shall also be responsible for the authenticity and integrity of the submitted assessment materials.

3.1.4 The assessment organization shall verify the analysis, test reports and related documents submitted by the applicant, issue an assessment report and specify the grade.

3.1.5 Buildings applying for green financial services shall be calculated and explained in terms of energy saving measures, water saving measures, building energy consumption and carbon emissions, and shall form a special report.

3.2 Assessment and Rating

3.2.1 The assessment index system of green building shall consist of five categories of indexes: safety and durability, health and comfort, occupant convenience, resources saving and environment livability. Each category of indexes includes prerequisite items and scoring items. The assessment index system is also uniformly provided with bonus items.

3.2.2 The assessment result of the prerequisite items shall be “pass” or “fail”; the assessment result of the scoring items and the bonus items shall be score.

3.2.3 As for a multi-functional and comprehensive individual building, the applicable areas shall be assessed in accordance with all the provisions specified in this standard one by one to determine the score of each provision.

3.2.4 The scores of green building assessment shall be in accordance with the requirements specified in Table 3.2.4.

Table 3.2.4 Scores of Green Building Assessment

	Basic score for prerequisite items	Full score of scoring items for assessment index					Full score of bonus items for promotion and innovation
		Safety and durability	Health and comfort	Occupant convenience	Resources saving	Environment livability	
Pre-assessment score	400	100	100	70	200	100	100
Assessment score	400	100	100	100	200	100	100

Note: No score for articles 6.2.10, 6.2.11, 6.2.12, 6.2.13, and 9.2.8 of this standard in pre assessment.

3.2.5 The total score of the assessment of green building is calculated using the following equation:

$$Q = (Q_0 + Q_1 + Q_2 + Q_3 + Q_4 + Q_5 + Q_A)/10 \quad (3.2.5)$$

Where Q ——the total score;

Q_0 ——the basic score of the prerequisite items, which is scored 400 points when all the prerequisite items are passed;

$Q_1 \sim Q_5$ ——the scores of the scoring items of five categories (safety and durability, health and comfort, occupant convenience, resources saving, and environment livability);

Q_A ——the score of bonus items for promotion and innovation.

3.2.6 Green buildings shall be divided into four grades: basic, one-star, two-star and three-star.

3.2.7 When the requirements of all prerequisite items are met, the green building grade shall be the basic grade.

3.2.8 The star grade of green building shall be rated according to the following requirements:

1 Green buildings of one-star, two-star and three-star shall meet the requirements of all prerequisite items in this standard and the score for scoring items of each category of index shall not be less than 30% of its full score;

2 Green buildings of one-star, two-star and three-star shall be decorated, and the quality, selected materials and product quality of decorated projects shall meet the requirements of the current relevant standards of the nation.

3 When the total score reaches 60 points, 70 points, 85 points respectively and meanwhile the requirements specified in Table 3.2.8 are met, the green buildings are rated as the grade of one-star, two-star and three-star respectively.

Table 3.2.8 Technical Requirements of One-star, Two-star and Three-star Green Buildings

	One-star grade	Two-star grade	Three-star grade
The ratio of improvement of thermal performance of building envelope, or the ratio of reduction of load of building heating and air conditioning	The thermal performance in building envelope increases 5%; Or the load in building heating and air conditioning reduces 5%	The thermal performance in building envelope increases 10%; Or the load in building heating and air conditioning reduces 10%	The thermal performance in building envelope increases 20%; Or the load in building heating and air conditioning reduces 15%
The ratio of heat transfer coefficient of exterior windows of residential buildings in cold and severe cold regions reduced	5%	10%	20%
Water efficiency grade of sanitary appliances	Grade 3	Grade 2	
Sound insulation performance of residential building	—	The air-borne sound insulation performance between the outdoor and bedroom, and between the bedrooms on both sides of household partition wall (floor), and the impact sound insulation performance of the bedroom floor reach the average value of the base value and the comfort value	The airborne sound insulation performance between the outdoor and bedroom, and between the bedrooms on both sides of household partition wall (floor), and the impact sound insulation performance of the bedroom floor reach the comfort value

Table 3. 2. 8 (Continued)

	One-star grade	Two-star grade	Three-star grade
Reduction proportion of main indoor air pollutants	10%	20%	
Air permeability of external window	Comply with the requirements stipulated in the current relevant standards of the nation for building energy efficiency design, and the connection of the exterior window opening with the exterior window body shall be tight		

Notes: 1 The benchmark for improving the thermal performance of the building envelope and reducing the heat transfer coefficient of exterior windows of residential buildings in cold and severe cold regions are the requirements stipulated in the current relevant standards of the nation for building energy efficiency design.

2 The standard corresponding to sound insulation performance of residential buildings is the current national standard GB 50118 *Code for design of sound insulation of civil buildings*.

3 The main indoor air pollutants include ammonia, formaldehyde, benzene, total volatile organic compounds, radon, inhalable particulate matter, etc. . The benchmark for concentration reduction is the relevant requirements stipulated in the current national standard GB/T 18883 *Indoor air quality standard*.

4 Safety and Durability

4.1 Prerequisite Items

4.1.1 Sites with geological risks such as landslides and mudslides shall be avoided. Flood-prone areas shall be provided with flood-proof infrastructure; the sites shall be free from the threats of dangerous chemicals, inflammable and explosive sources as well as the hazards of electromagnetic radiation and radon-containing soil.

4.1.2 The building structure shall meet the requirements for bearing capacity and building function. Building envelopes such as the exterior wall, roofing, doors and windows, curtain walls and exterior insulation of the building shall meet the requirements of safety, durability and protection.

4.1.3 External facilities such as external shading, solar energy facilities, concrete slab for the outdoor air conditioning units, and flower beds on the exterior wall shall be designed and constructed in a unified manner with the main structure of the building, and shall be easily accessible for installation, overhaul and maintenance.

4.1.4 Non-structural components, equipment and ancillary facilities inside the building shall be connected firmly and adapted to the deformation of the main structure.

4.1.5 The exterior doors and windows of the building must be installed firmly, and its wind load resistance performance and watertightness shall meet the requirements stipulated in the current relevant standards of the nation.

4.1.6 The floor of the bathroom and toilet shall be provided with a waterproof layer and their walls and ceilings shall be provided with a moisture-proof layer.

4.1.7 Passage spaces such as corridors and evacuation passages shall meet the requirements of emergency evacuation and emergency rescue, and shall be kept unblocked.

4.1.8 The warning and guidance signage system for safety protection shall be installed in the building.

4.2 Scoring Items

I Safety

4.2.1 The adoption of performance-based seismic design and the rational improvement of the seismic performance of the building are totally scored 10 points.

4.2.2 Take protective measures to ensure people's safety, which is respectively scored and accumulated according to the following criteria, totally 15 points;

1 Take measures to improve the protection level of balcony, exterior window, windowsill, balustrade, etc. , which is scored 5 points;

2 Building entrances and exits are provided protective measures for accidental fallout of external wall decorations as well as the glazing of doors and windows, and the protective measures are combined with sunshade, wind or rain protection facilities in the area open to people, which is

scored 5 points;

3 Use the site or landscape to form a buffer zone and isolation zone that can reduce the risk of falling objects, which is scored 5 points.

4.2.3 Use products or accessories with safety protection, which is respectively scored and accumulated according to the following criteria, totally 10 points:

1 Use glasses with safety protection function, which is scored 5 points;

2 Use doors and windows with anti-pinch function, which is scored 5 points.

4.2.4 Take anti-slip measures for indoor and outdoor floors or road surfaces, which is respectively scored and accumulated according to the following criteria, totally 10 points:

1 Take anti-slip measures for building entrances and exits, platforms, public corridors, elevator halls, kitchens, bathrooms, toilets, etc., the anti-slip level is not lower than B_d Grade and B_w Grade stipulated in the current professional standard JGJ/T 331 *Technical specification for slip resistance of building floor*, which is scored 3 points;

2 As for anti-slip ground for indoor and outdoor activities, the anti-slip level reaches A_d and A_w stipulated in the current professional standard JGJ/T 331 *Technical specification for slip resistance of building floor*, which is scored 4 points;

3 The anti-slip level of construction ramps and stair steps reaches A_d and A_w stipulated in the current professional standard JGJ/T 331 *Technical specification for slip resistance of building floor*, or is one level higher than the level ground, and anti-slip construction technology measures such as the use of anti-slip bars, which is scored 3 points.

4.2.5 Separate pedestrian system from vehicle system, and provide the walking and bicycle transportation system with sufficient lighting, which is scored 8 points.

II Durability

4.2.6 Take measures to improve the structural adaptability of buildings, which is relatively scored and accumulated according to the following criteria, totally 18 points:

1 Take a general open, flexible and variable space design, or adopt measures of variable building function, which is scored 7 points;

2 The building structure is separated from the construction equipment pipeline, which is scored 7 points;

3 Adopt layout or control methods of equipment facilities that are compatible with building functions and spatial changes, which is scored 4 points.

4.2.7 Take measures to improve the durability of building parts, which is respectively scored and accumulated according to the following criteria, totally 10 points:

1 Adopt pipes, pipelines and fittings with good corrosion resistance, anti-aging and durability, which is scored 5 points;

2 The movable parts are selected from long-life products, and the same lifespan of the parts combination is considered; when the parts of different service life are connected, the structure easy to be separately replaced and updated is adopted, which is scored 5 points.

4.2.8 Improve the durability of building structure materials, which is scored according to the following criteria, totally 10 points:

1 Design for 100-year durability, which is scored 10 points.

2 Adopt building structure materials with good durability that meet one of the following conditions, which is scored 10 points:

- 1)** For concrete members, increase the thickness of the protective layer of the rebar or use high-durability concrete;
- 2)** For steel members, adopt weather-resistant structural steel and weather-resistant anti-corrosive coatings;
- 3)** For wood members, use anti-corrosive wood, durable wood or durable wood products.

4.2.9 Rationally use durable and easy-to-maintain decorative building materials, which is respectively scored and accumulated according to the following criteria, totally 9 points:

- 1** Adopt durable exterior finish materials, which is scored 3 points;
- 2** Adopt durable waterproof and sealing materials, which is scored 3 points;
- 3** Adopt durable and easy-to-maintain interior decoration materials, which is scored 3 points.

5 Health and Comfort

5.1 Prerequisite Items

5.1.1 The concentration of pollutants such as ammonia, formaldehyde, benzene, total volatile organic compounds and radon in indoor air shall meet the requirements of the current national standard GB/T 18883 *Indoor air quality standard*. Smoking shall be prohibited in the rooms and at the main entrances and exits of the building and non-smoking signs shall be set up in conspicuous positions.

5.1.2 Measures shall be taken to avoid the air and pollutants in the kitchen, dining room, printing and copying room, bathroom, underground garage and other areas from going into other spaces; the exhaust backflow of kitchen and bathroom shall be prevented.

5.1.3 The setting of water supply and drainage system shall be in accordance with the following requirements;

1 The quality of drinking water shall meet the requirements of current national standard GB 5749 *Standards for drinking water quality*.

2 The regular cleaning and disinfection plan for water storage facilities such as water reservoirs and water tanks shall be formulated and implemented, and the drinking water storage facilities shall be cleaned and disinfected at least once every six months;

3 The toilet with built-in water seal inside the structure shall be used, and its water seal depth shall be not less than 50mm;

4 The pipelines and equipment for non-traditional water source utilization systems shall be provided with definite, clear and permanent marks.

5.1.4 The indoor noise level and sound insulation performance of the main function rooms shall be in accordance with the following requirements:

1 The indoor noise level shall meet the base value stipulated in the current national standard GB 50118 *Code for design of sound insulation of civil buildings*.

2 The sound insulation performance of exterior walls, partition walls, slabs, doors and windows shall meet the base value stipulated in the current national standard GB 50118 *Code for design of sound insulation of civil buildings*.

5.1.5 The building lighting shall be in accordance with the following requirements:

1 The quantity and quality of lighting shall meet the requirements of the current national standard GB 50034 *Standard for lighting design of buildings*.

2 In the places for long-term stays, the non-hazardous lighting products which meet the requirements of the current national standard GB/T 20145 *Photobiological safety of lamps and lamp systems* shall be adopted.

3 The fluctuation depth of the light output waveform of the LED lighting product shall meet the requirements of the current national standard GB/T 31831 *Technical requirements for application of LED indoor lighting*.

5.1.6 Measures shall be taken to ensure the indoor thermal environment. For buildings with

central heating and air conditioning systems, the design parameters of the room such as temperature, humidity and fresh air volume shall comply with the relevant requirements of the current national standard GB 50736 *Design code for heating ventilation and air conditioning of civil buildings*; for buildings with non-central heating and air conditioning systems, measures or reserved conditions for the guarantee of the indoor thermal environment shall be provided.

5.1.7 The thermal performance of the building envelope shall meet the following requirements:

1 Under the condition of indoor design temperature and humidity, dew shall not appear on the inner surface of the non-transparent building envelope;

2 Condensation shall not exist on the roof and the inside of exterior walls of the heating building;

3 The thermal insulation performance of the roof and exterior wall shall meet the requirements of the current national standard GB 50176 *Code for thermal design of civil building*.

5.1.8 The main function rooms shall be equipped with a thermal environment adjustment device independently controlled on site.

5.1.9 The underground garage shall be equipped with a carbon monoxide concentration monitoring device linked to the exhaust equipment.

5.2 Scoring Items

I Indoor Air Quality

5.2.1 Control the concentration of main air pollutants in the room, which is respectively scored and accumulated according to the following criteria, totally 12 points:

1 The concentrations of ammonia, formaldehyde, benzene, total volatile organic compounds, radon and other pollutants are 10% lower than the limits stipulated in the current national standard GB/T 18883 *Indoor air quality standard*, which is scored 3 points; it is 20% lower than the limits, which is scored 6 points;

2 The annual average concentration of $PM_{2.5}$ in the room is not higher than $25\mu g/m^3$, and the annual average concentration of PM_{10} in the room is not higher than $50\mu g/m^3$, which is scored 6 points.

5.2.2 The selected decoration materials meet the requirements of the harmful substances limits stipulated in the current standards of the nation for green products assessment, which is scored totally 8 points. 3 types and above of decoration materials met the requirements, which is scored 5 points; 5 types and above, which is scored 8 points.

II Water Quality

5.2.3 The water quality of fine drinking water, central domestic hot water, swimming pool water, heating and air conditioning system water, waterscape, etc. meet the requirements stipulated in the current relevant standards of the nation, which is scored 8 points.

5.2.4 Measures are taken for water storage facilities such as drinking water reservoirs and water tanks to meet the hygiene requirements, which is respectively scored and accumulated according to the following criteria, totally 9 points:

1 Use the finished product water tank that meets the requirements stipulated in the current relevant standards of the nation, which is scored 4 points;

2 Take measures to ensure that the stored water does not deteriorate, which is scored 5 points.

5.2.5 All water supply and drainage pipes, equipment and facilities are provided with definite, clear and permanent marks, which is scored 8 points .

III Sound and Daylighting

5.2.6 Measures are taken to optimize the indoor acoustic environment of the main function rooms, which is scored totally 8 points. The noise level reaches the average value of the base value and the comfort value stipulated in the current national standard GB 50118 *Code for design of sound insulation of civil buildings*, which is scored 4 points; the high standard limit is reached, which is scored 8 points.

5.2.7 The main function rooms have good sound insulation performance which is respectively scored and accumulated according to the following criteria, totally 10 points:

1 The air-borne sound insulation performance between the members and the adjacent rooms reaches the average value of the base value and the comfort value stipulated in the current national standard GB 50118 *Code for design of sound insulation of civil buildings*, which is scored 3 points; the comfort value is reached, which is scored 5 points;

2 The impact sound insulation performance of the floor slab reaches the average value of the base value and the comfort value stipulated in the current national standard GB 50118 *Code for design of sound insulation of civil buildings*, which is scored 3 points; the comfort value is reached, which is scored 5 points.

5.2.8 Make full use of daylighting, which is respectively scored and accumulated according to the following criteria, totally 12 points:

1 As for at least 60% area of main functional spaces of the residential building, its average number of hours with an daylighting illuminance value of not less than 300lx is not less than 8h/d, which is scored 9 points;

2 Public buildings are respectively scored and accumulated according to the following criteria:

1) The area ratio of the inner area daylight factor meeting the daylighting requirements is 60%, which is scored 3 points;

2) The ratio of the area of the underground space with an average daylight factor of not less than 0.5% to the area of the first basement floor is more than 10%, which is scored 3 points;

3) The hours of at least 60% floor area of the indoor main functional spaces with required daylighting illuminance value is not less than 4h/d, which is scored 3 points.

3 The main function rooms has glare control measures, which is scored 3 points.

IV Indoor Thermal Environment

5.2.9 Indoor thermal and humid environment is favorable, which is scored according to the following criteria, totally 8 points:

1 For buildings with natural ventilation or hybrid ventilation, the time ratio of indoor thermal environment parameters in the main functional rooms of the building to the adaptive thermal comfort zone reaches 30%, which is scored 2 points; for each additional 10%, 1 point is added, at most 8 points.

2 For the building with artificial cold and heat sources, the area ratio of main functional rooms in which the thermal and humid environment reaching Grade II of the overall assessment for the air conditioned and heating building stipulated in the current national standard GB/T 50785 *Evaluation standard for indoor thermal environment in civil buildings* reaches 60%, which is scored 5 points; for each additional 10%, 1 point is added, at most 8 points.

5.2.10 Optimize the building space and plane layout, improve the natural ventilation effect, which is scored according to the following criteria, totally 8 points:

1 Residential buildings: the ratio of the ventilation opening area to the room floor area reaches 12% in the hot summer and warm winter areas, 8% in the hot summer and cold winter areas, and 5% in other areas, which is scored 5 points; for each additional 2%, 1 point is added, at most 8 points.

2 Public buildings: under the typical working conditions of the transitional season, the proportion of the area with average natural ventilation air exchange rate of the main functional rooms at not less than 2 times/h reaches 70%, which is scored 5 points; for each additional 10%, 1 point is added, at most 8 points.

5.2.11 The adjustable shading facilities are set to improve the indoor thermal comfort, which is scored according to the proportion of the adjustable shade area to the transparent part of the exterior window and the criteria specified in Table 5.2.11, totally 9 points.

Table 5.2.11 Scoring Criteria for the Proportion of the Area of Adjustable Shading Facilities in the Transparent Part of the Exterior Window.

The proportion of the area of adjustable shading facilities in the transparent part of the exterior window, S_z	Score (points)
$25\% \leq S_z < 35\%$	3
$35\% \leq S_z < 45\%$	5
$45\% \leq S_z < 55\%$	7
$S_z \geq 55\%$	9

6 Occupant Convenience

6.1 Prerequisite Items

- 6.1.1** Accessible barrier-free walking system shall be provided between buildings, outdoor sites, public green spaces and urban roads.
- 6.1.2** There shall be a public transportation station or a dedicated shuttle bus to public transportation stations within 500m distant from the pedestrian entrance.
- 6.1.3** The parking lot shall be equipped with the charging facilities of electric vehicle or the installation conditions of the charging facilities, and rationally provided with the parking space for the electric car and the barrier-free car.
- 6.1.4** Bicycle parking lot shall be located in a rational and convenient place.
- 6.1.5** The building equipment management system shall have automatic monitoring and management functions.
- 6.1.6** The building shall be equipped with an information network system.

6.2 Scoring Items

I Transit and Accessibility

6.2.1 The site is easily connected with public transportation stations, which is respectively scored and accumulated according to the following criteria, totally 8 points:

1 The walking distance from the entrance to the bus station shall not exceed 500m, or the walking distance to the subway station shall not exceed 800m, which is scored 2 points; the walking distance from the entrance to the bus station shall not exceed 300m, or the walking distance to the subway station is not more than 500m, which is scored 4 points;

2 There are not less than 2 lines of public transportation stations within a distance of 800m from the entrance and exit of the site, which is scored 4 points.

6.2.2 The indoor and outdoor public areas of the building meet the requirements of the all-age design, which is respectively scored and accumulated according to the following criteria, totally 8 points:

1 Indoor public areas, outdoor public events venues and roads of the building meet the barrier-free design requirements, which is scored 3 points;

2 The corners of the walls, columns, etc. in the indoor public areas of the building are round, and are provided with safety grab bars or handrails, which is scored 3 points;

3 Barrier-free elevator that can accommodate a stretcher is provided, which is scored 2 points.

II Service Facility

6.2.3 Convenient public service is provided, which is scored according to the following criteria, totally 10 points:

1 Residential buildings meet four items specified in the following requirements, which is scored 5 points; residential buildings meet six or more items specified in the following requirements, which is scored 10 points.

- 1) The walking distance from the entrance to the kindergarten is not more than 300m;
- 2) The walking distance from the entrance to the primary school is not more than 500m;
- 3) The walking distance from the entrance to the high school is not more than 1000m;
- 4) The walking distance from the entrance to the hospital is not more than 1000m;
- 5) The walking distance from the entrance to the people's cultural activities facilities is not more than 800m;
- 6) The walking distance from the entrance to the day care facilities for the elderly is not more than 500m;
- 7) There are not less than three commercial service facilities within 500m distant from the site.

2 Public buildings meet three items specified in the following requirements, which is scored 5 points; public buildings meet five items specified in the following requirements, which is scored 10 points.

- 1) The building is compatible with at least 2 public service functions for the society;
- 2) The building provides an open public space for the public;
- 3) The number of vehicle spaces in the charging piles of electric vehicles accounts for not less than 10% of the total number of vehicle spaces;
- 4) There is a public parking lot (garage) within 500m of the surrounding area;
- 5) The site is not closed or the public walkway within the site is open to the public.

6.2.4 Open spaces such as urban green spaces, plazas and public sport fields are accessible by walking, which is scored and accumulated according to the following criteria, totally 5 points:

1 The walking distance from the entrance to the urban park green space, residential park and plazas is not more than 300m, which is scored 3 points;

2 The walking distance to the medium-sized multi-purpose sports field is not more than 500m, which is scored 2 points.

6.2.5 The fitness field and space are reasonably set, which is respectively scored and accumulated according to the following criteria, totally 10 points:

1 The area of outdoor fitness field is not less than 0.5% of the total land area, which is scored 3 points;

2 Set special fitness slow track with a width of not less than 1.25m and the length not less than 1/4 of the circumference of the red line of the land and not less than 100m, which is scored 2 points;

3 The area of indoor fitness space is not less than 0.3% of the above-ground building floor area and not less than 60m², which is scored 3 points.

4 Staircases have daylight and good view, and the distance from the main entrance is not more than 15m, which is scored 2 points.

III Intelligent Operation

6.2.6 Set up the automatic remote measurement system for classification and grading, and

arrange the energy management system to achieve monitoring, data analysis and management of building energy consumption, which is scored 8 points.

6.2.7 Set the air quality monitoring system of PM₁₀, PM_{2.5}, CO₂ concentration, and have the functions such as storing monitoring data for at least one year and real-time display, which is scored 5 points.

6.2.8 Set up the remote water metering system and the online water quality monitoring system, which is respectively scored and accumulated according to the following criteria, totally 7 points:

1 Set up the remote water metering system, which can conduct classification and grading record and statistically analyze various water use conditions, which is scored 3 points;

2 Use the metering data to automatically detect, analyze and rectify the leakage of the pipeline network and the pipeline leakage rate is less than 5%, which is scored 2 points;

3 Set up an online water quality monitoring system to monitor the water quality indexes of drinking water, fine drinking water, swimming pool water, non-traditional water sources, and air conditioning cooling water, record and preserve the water quality monitoring results that are available for users to inquire anytime, which is scored 2 points.

6.2.9 Intelligent service system is equipped, which is respectively scored and accumulated according to the following criteria, totally 9 points:

1 At least 3 types of service functions are provided, such as home appliance control, lighting control, security alarm, environmental monitoring, building equipment control, work and life service, which is scored 3 points;

2 Remote monitoring function is provided, which is scored 3 points;

3 Functions accessible to smart city (district, community) is provided, which is scored 3 points.

IV Property Management

6.2.10 Formulate sound operating procedures and emergency plans for energy saving, water saving, material saving and greening, implement an incentive mechanism for energy and resource management, and implement it effectively, which is respectively scored and accumulated according to the following criteria, totally 5 points:

1 Relevant facilities are provided with complete operating procedures and emergency plans, which is scored 2 points;

2 The work assessment system of property management agency includes appraisal incentive mechanisms for energy-saving and water-saving performance, which is scored 3 points.

6.2.11 The average daily water consumption of the building meets the requirements of the rated water consumption for water saving stipulated in the current national standard GB 50555 *Standard for water saving design in civil building*, which is scored according to the following criteria, totally 5 points:

1 The average daily water consumption is higher than the average value of the rated water consumption for water saving, but not higher than the upper limit value, which is scored 2 points.

2 The average daily water consumption is higher than the lower limit value of the rated water consumption for water saving, but not higher than the average value, which is scored 3 points.

3 The average daily water consumption is not higher than the lower limit value of the rated

water consumption for water saving, which is scored 5 points.

6.2.12 Evaluate the operation effect of the building regularly and optimize the operation according to the evaluation result, which is respectively scored and accumulated according to the following criteria, totally 12 points:

1 Develop the technical plan for assessing the effect of green building operations, which is scored 3 points;

2 Regularly inspect and adjust public facilities and equipment, and provide complete records of inspection, commissioning, operation, calibration, which is scored 3 points;

3 Regularly conduct diagnostic assessment on energy-saving, and formulate an optimization plan based on the assessment results and implement it, which is scored 4 points;

4 Regularly check and publicize the quality of various water, which is scored 2 points.

6.2.13 Establish the green education publicity and practice mechanism, develop a green facility manual, form a good green atmosphere, and regularly conduct user satisfaction survey, which is respectively scored and accumulated according to the following criteria, totally 8 points:

1 Each year organize not less than 2 times of green building technology publicity, green life guidance, disaster emergency drills and other green education publicity and practice activities with a record, which is scored 2 points;

2 Have a platform for green life display, experience or exchange sharing, and provide users with a green facility manual, which is scored 3 points;

3 Conduct user satisfaction survey for the green performance of the building once a year, and improve, implement and publicize it based on the survey results, which is scored 3 points.

7 Resources Saving

7.1 Prerequisite Items

7.1.1 Energy saving design of the building's shape, plane layout, spatial scale, building envelope, etc. , shall be carried out in combination with the natural conditions of the site and the functional requirements of the building, and shall meet requirements of the national energy saving design standards.

7.1.2 Measures shall be taken to reduce the energy consumption of heating and air conditioning system underpart load and partial space, and shall meet the following requirements:

1 Heating and air conditioning area shall be distinguished according to room orientation, and the system shall be controlled by zones.

2 The integrated part load value (*IPLV*) of the air conditioning cold source and the system coefficient of refrigeration performance (*SCOP*) of the electric cold source shall meet the requirements of the current national standard GB 50189 *Design standard for energy efficiency of public buildings*.

7.1.3 The temperatures shall be set according to the building space function, and the temperature setting standard of indoor transition zone shall be rationally lowered.

7.1.4 Lighting power density in the main functional rooms shall not be higher than the current values stipulated in the current national standard GB 50034 *Standard for lighting design of buildings*; as for the lighting system in the public area, energy-saving control measures like zoning, time setting and induction shall be taken; the lighting control of daylighting area shall be independent of the lighting system in other areas.

7.1.5 Energy consumption for cold and heat sources, distribution system and lighting shall be independently metered item by item.

7.1.6 The vertical elevator shall adopt energy saving measures such as group control ,frequency control or energy feedback; escalator shall adopt energy-saving control measures such as frequency conversion induction start.

7.1.7 Water resource utilization plan shall be made for overall utilization of various water resources, and shall meet the following requirements:

1 Water metering device shall be set up respectively according to application, charging or administrative unit to measure water consumption;

2 The water distribution branch pipe with water pressure greater than 0.2 MPa at the water point shall be provided with pressure reducer, and meet the minimum operating pressure requirements of the water supply fittings;

3 Water appliances and equipments shall meet the requirements of water-saving products.

7.1.8 Building structures in severely irregular shape and layout shall not be used.

7.1.9 The architectural modeling elements shall be concise and free from abundant decorative members, and shall meet the following requirements:

1 The ratio of the cost of residential buildings' decorative members to the total cost of the

building shall not be greater than 2%;

2 The ratio of the cost of public buildings' decorative members to the total cost of the building shall not be greater than 1%.

7.1.10 The adopted building materials shall meet the following requirements:

1 The ratio of the weight of building materials produced within 500km from the construction site to the total weight of building materials shall be greater than 60%.

2 Ready-mixed concrete and ready-mixed mortar shall be adopted for the construction.

7.2 Scoring Items

I Land Saving and Land Utilization

7.2.1 The land use is economically and intensively, which is scored according to the following criteria, totally 20 points:

1 Residential buildings are scored according to per capita residential land index for neighborhood blocks and the criteria specified in Table 7.2.1-1.

Table 7.2.1-1 Scoring criteria for per capita residential land index points for neighborhood blocks

Climatic regionalization for architecture	Per capita residential land index A (m^2)					Score (points)
	≤ 3 storeys in average	4~6 storeys in average	7~9 storeys in average	10~18 storeys in average	≥ 19 storeys in average	
I and VII	$33 < A \leq 36$	$29 < A \leq 32$	$21 < A \leq 22$	$17 < A \leq 19$	$12 < A \leq 13$	15
	$A \leq 33$	$A \leq 29$	$A \leq 21$	$A \leq 17$	$A \leq 12$	20
II and VI	$33 < A \leq 36$	$27 < A \leq 30$	$20 < A \leq 21$	$16 < A \leq 17$	$12 < A \leq 13$	15
	$A \leq 33$	$A \leq 27$	$A \leq 20$	$A \leq 16$	$A \leq 12$	20
III, IV and V	$33 < A \leq 36$	$24 < A \leq 27$	$19 < A \leq 20$	$15 < A \leq 16$	$11 < A \leq 12$	15
	$A \leq 33$	$A \leq 24$	$A \leq 19$	$A \leq 15$	$A \leq 11$	20

2 Public buildings are scored according to the floor area ratio of different functional buildings (R) and the criteria specified in Table 7.2.1-2.

Table 7.2.1-2 Scoring criteria for floor area ratio points for public buildings

Administrative offices, business offices, commercial finance, hotels, restaurants, traffic hubs, etc.	Education, culture, sports, health care, social welfare, etc.	Score (points)
$1.0 \leq R < 1.5$	$0.5 \leq R < 0.8$	8
$1.5 \leq R < 2.5$	$R \geq 2.0$	12
$2.5 \leq R < 3.5$	$0.8 \leq R < 1.5$	16
$R \geq 3.5$	$1.5 \leq R < 2.0$	20

7.2.2 Rationally develop and utilize underground space, which is scored according to the underground space development and utilization index and the criteria specified in Table 7.2.2, totally 12 points.

Table 7.2.2 Scoring criteria for underground space development and utilization index points

Building type	Underground space development and utilization index		Score (points)
Residential building	Ratio of underground building floor area to above-ground buildings floor area R_r Ratio of first underground storey building floor area to total construction land area R_p	$5\% \leq R_r < 20\%$	5
		$R_r \geq 20\%$	7
		$R_r \geq 35\%$ and $R_p < 60\%$	12
Public building	Ratio of underground building floor area to total construction land area R_{pl} Ratio of first underground storey building floor area to total construction land area R_p	$R_{pl} \geq 0.5$	5
		$R_{pl} \geq 0.7$ and $R_p < 70\%$	7
		$R_{pl} \geq 1.0$ and $R_p < 60\%$	12

7.2.3 Adopt mechanical parking garage, underground parking garage or parking structure, etc. , which is scored according to the following criteria, totally 8 points:

1 The ratio of the number of ground parking spaces in a residential building to the total number of residential sets is less than 10%, which is scored 8 points.

2 The ratio of the area of ground parking spaces to the total construction land area is less than 8%, which is scored 8 points.

II Energy Saving and Energy Resources Utilization

7.2.4 Optimize the thermal performance of the building envelope, which is scored according to the following criteria, totally 15 points:

1 The thermal performance of building envelope is improved up to 5% than that stipulated in the current relevant standards of the nation for building energy efficiency design, which is scored 5 points; it is improved up to 10%, which is scored 10 points; it is improved up to 15%, which is scored 15 points.

2 The annual calculated load for building heating and air conditioning is reduced up to 5%, which is scored 5 points; it is reduced up to 10%, which is scored 10 points; it is reduced up to 15%, which is scored 15 points.

7.2.5 The energy efficiency of both cold and heat source unit of the heating and air conditioning system is superior to the requirements stipulated in the current national standard GB 50189 *Design standard for energy efficiency of public buildings* as well as minimum allowable values of energy efficiency stipulated in the relevant national standards, which is scored according to the criteria specified in Table 7.2.5, totally 10 points.

Table 7.2.5 Scoring criteria for increasing degree of energy efficiency indexes of cold and heat source unit

Unit type	Energy efficiency index	Reference standard	Score requirements	
Vapor compression cycle water chiller (heat pump) unit driven by motor	Coefficient of performance (COP) for cooling	Current national standard GB 50189 <i>Design standard for energy efficiency of public buildings</i>	Increasing by 6%	Increasing by 12%

Table 7. 2. 5 (Continued)

Unit type		Energy efficiency index	Reference standard	Score requirements	
Direct-fired Li Br absorption cold (warm) water unit		Coefficient of performance (<i>COP</i>) for cooling and heating	Current national standard GB 50189 <i>Design standard for energy efficiency of public buildings</i>	Increasing by 6%	Increasing by 12%
Unitary air conditioner, duct and roof-top air conditioning units		Energy efficiency ratio (<i>EER</i>)		Increasing by 6%	Increasing by 12%
Multi-connected air-conditioning (heat pump) unit		Integrated part load value [<i>IPLV</i> (C)]		Increasing by 8%	Increasing by 16%
Boiler	Fuel	Thermal efficiency		Increasing by 3 percentage points	Increasing by 6 percentage points
	Oil and gas	Thermal efficiency		Increasing by 2 percentage points	Increasing by 4 percentage points
Room air conditioner		Energy efficiency ratio (<i>EER</i>) and energy consumption efficiency	Current relevant national standards	Evaluating values of energy conservation	Limit value of Grade 1 energy efficiency
Home gas-fired water heater		Thermal efficiency value (η)			
Steam-operated Li Br absorption cold (warm) water unit		Coefficient of performance (<i>COP</i>) for cooling and heating			
Score (points)				5	10

7.2.6 Take effective measures to reduce the energy consumption of the end system and distribution system of the heating and air conditioning system, which is respectively scored and accumulated according to the following criteria, totally 5 points:

1 Fan power consumption of per unit air volume of Heating, Ventilation and Air Conditioning HVAC system is 20% lower than the requirement stipulated in the current national standard GB 50189 *Design standard for energy efficiency of public buildings*, which is scored 2 points;

2 The electricity consumption to transferred heat quantity ratio of hot water circulating pump of central heating system and electricity consumption to transferred cooling (heat) quantity ratio of circulating water pump of air-conditioning hot and cold water system is 20% lowered than the values stipulated in the current national standard GB 50736 *Design code for heating ventilation and air conditioning of civil buildings*, which is scored 3 points.

7.2.7 Energy-saving electrical equipment is adopted and energy-saving control measures are taken, which is respectively scored and accumulated according to the following criteria, totally 10 points:

1 Lighting power density of the main functional rooms reach the target values stipulated in

the current national standard GB 50034 *Standard for lighting design of buildings*, which is scored 5 points;

2 Artificial lighting in the daylight area is automatically adjusted with the change of daylight illuminance, which is scored 2 points;

3 Lighting products, three-phase transformers, pumps, fans and other equipments meet the requirements of energy-saving assessment values stipulated in the current relevant standards of the nation, which is scored 3 points.

7.2.8 Take measures to reduce building energy consumption, which is totally scored 10 points. The energy consumption of the building is 10% lower than that stipulated in the current relevant standards of the nation for building energy efficiency, which is scored 5 points; it is 20% lower, which is scored 10 points.

7.2.9 Rationally utilize renewable energy in accordance with local climate and natural resources, which is scored according to the criteria specified in Table 7.2.9, totally 10 points.

Table 7.2.9 Scoring criteria for renewable energy utilization points

Utilization type and index of renewable energy		Score (points)
Ratio of domestic hot water provided by renewable energy R_{hw}	$20\% \leq R_{hw} < 35\%$	2
	$35\% \leq R_{hw} < 50\%$	4
	$50\% \leq R_{hw} < 65\%$	6
	$65\% \leq R_{hw} < 80\%$	8
	$R_{hw} \geq 80\%$	10
Ratio of cooling and heating capacity for air conditioning provided by renewable energy R_{ch}	$20\% \leq R_{ch} < 35\%$	2
	$35\% \leq R_{ch} < 50\%$	4
	$50\% \leq R_{ch} < 65\%$	6
	$65\% \leq R_{ch} < 80\%$	8
	$R_{ch} \geq 80\%$	10
Ratio of electricity provided by renewable energy R_e	$0.5\% \leq R_e < 1.0\%$	2
	$1.0\% \leq R_e < 2.0\%$	4
	$2.0\% \leq R_e < 3.0\%$	6
	$3.0\% \leq R_e < 4.0\%$	8
	$R_e \geq 4.0\%$	10

III Water Saving and Water Resource Utilization

7.2.10 Use sanitary apparatus with relatively high water efficiency grade, which is scored according to the following criteria, totally 15 points:

1 The water efficiency of all sanitary apparatus reaches Grade 2, which is scored 8 points.

2 The water efficiency of more than 50% sanitary apparatus reaches Grade 1 and the remainder reaches Grade 2, which is scored 12 points.

3 The water efficiency of all sanitary apparatus reaches Grade 1, which is scored 15 points.

7.2.11 Adopt water-saving equipment or technology for greening irrigation and air conditioning cooling water system, which is respectively scored and accumulated according to the following criteria, totally 12 points:

1 Adopt water-saving equipment or technology for greening irrigation, which is scored

according to the following criteria respectively:

- 1) Adopt a water-saving irrigation system, which is scored 4 points.
 - 2) Based on the adoption of water-saving irrigation system, take water-saving control measures such as setting soil humidity sensors and automatically closing device in rainy days, or grow plants without the need of permanent irrigation, which is scored 6 points.
- 2 Adopt water-saving equipment or technology for air conditioning cooling water system, which is scored according to the following criteria respectively:
- 1) Take measures for circulating cooling water system, such as water treatment, enlarging water collector and installing balance pipe or balance tank to avoid the overflow of cooling water when cooling water pump is shutdown, which is scored 3 points;
 - 2) Adopt cooling technology without water consumption by evaporation, which is scored 6 points.
- 7.2.12** Combine the integrated rainwater utilization facilities to create outdoor waterscape with a supplementary amount of used rainwater greater than 60% of water evaporation, and the ecological water treatment technology is used to ensure the water quality, which is respectively scored and accumulated according to the following criteria, totally 8 points:
- 1 For rainwater entering the outdoor waterscape, ecological facilities are used to reduce runoff pollution, which is scored 4 points;
 - 2 The existence of aquatic animals and aquatic plants is used for ensuring the water quality of outdoor waterscape, which is scored 4 points.
- 7.2.13** Use non-traditional water sources, which is scored and accumulated respectively according to the following criteria, totally 15 points:
- 1 For the water consumption of greening irrigation, garage and road washing and vehicle cleaning, the non-traditional water consumption accounts for not less than 40% of the total water consumption, which is scored 3 points; it is not less than 60%, which is scored 5 points;
 - 2 For the water consumption of flushing toilet, the non-traditional water consumption accounts for not less than 30% of the total water consumption, which is scored 3 points; it is not less than 50%, which is scored 5 points.
 - 3 For the water consumption of cooling water supplement, the non-traditional water consumption accounts for not less than 20% of the total water consumption, which is scored 3 points; it is not less than 40%, which is scored 5 points.

IV Material Saving and Green Materials

- 7.2.14** The civil engineering and decoration engineering of all parts of the building are conducted as integrated design and construction, which is scored 8 points.
- 7.2.15** Rationally select the building structural materials and members, which is scored according to the following criteria, totally 10 points:
- 1 The concrete structure is respectively scored and accumulated according to the following criteria:
 - 1) The application ratio of Level 400MPa or above rebars reaches 85%, which is scored 5 points;

- 2) The proportion of the concrete with strength level not less than C50 for vertical bearing structure accounts for 50% of the total concrete amount for the vertical bearing structure, which is scored 5 points.
 - 2 The steel structure is respectively scored and accumulated according to the following criteria:
 - 1) Consumption of Q345 or above high strength steels accounts for 50% of the total steel amount, which is scored 3 points; it reaches 70%, which is scored 4 points;
 - 2) Non-site welded joints such as bolt connection account for 50% of all site connected and spliced joints, which is scored 4 points;
 - 3) Use roof panel that does not need supporting during construction, which is scored 2 points.
 - 3 Composite structure: the concrete structure part and steel structure part is scored respectively according to Item 1 and Item 2 of this clause, adopting the average value of these two scores.
- 7.2.16** The prefabricated interior decoration parts are used for building decoration, which is scored totally 8 points. The consumption of prefabricated interior decoration parts used for the decoration of the building, account for more than 50% of that of the similar parts; it reaches one type, which is scored 3 points; it reaches three types, which is scored 5 points; it reaches more than three types, which is scored 8 points.
- 7.2.17** Adopt recyclable materials, reusable materials and building materials made from waste products, which is scored and accumulated respectively according to the following criteria, totally 12 points:
- 1 The consumption ratio of recyclable materials and reusable materials is scored according to the following criteria:
 - 1) Consumption ratio of reusable materials and recyclable materials reaches 6% in the residential building or 10% in the public building, which is scored 3 points.
 - 2) Consumption ratio of reusable materials and recyclable materials reaches 10% in the residential building or 15% in the public building, which is scored 6 points.
 - 2 The use of building materials made from waste products and its consumption ratio are scored according to the following criteria:
 - 1) Adopt one type of building materials made from waste products, which accounts for not less than 50% of similar building materials, which is scored 3 points.
 - 2) Choose two or more types of building materials made from waste products, each of which accounts for not less than 30% of similar building materials, which is scored 6 points.
- 7.2.18** Use green building materials, which is scored totally 12 points. The ratio of using green building material is not less than 30%, which is scored 4 points; it is not less than 50%, which is scored 8 points; it is not less than 70%, which is scored 12 points.

8 Environment Livability

8.1 Prerequisite Items

- 8.1.1** The layout of buildings shall meet the standard of sunlight on buildings and shall not reduce the sunlight standard of the buildings around.
- 8.1.2** Outdoor thermal environment shall meet the requirements stipulated in the current relevant standards of the nation.
- 8.1.3** Green space allocation shall meet the requirements of the local urban and rural planning in a rational greening method. Planting shall be adapted to the local climate and soil, and shall be non-toxic and easy to be maintained while the depth of soiling and drainage capacity of the planting area meet the growth requirements of the plant. Multi-layer greening method shall be adapted.
- 8.1.4** The vertical design of the site shall be conducive to the collection or discharge of rainwater; the infiltration, retention or reuse of rainwater shall be effectively organized. Special design for rainwater management and utilization shall be carried out for the site larger than 10hm².
- 8.1.5** Signage system that is easy to identify and use shall be established both inside and outside the building.
- 8.1.6** The pollution sources with excessive discharge shall not exist in the site.
- 8.1.7** Municipal solid waste shall be collected and disposed by classification. Garbage containers and collection sites shall be set up reasonably and in harmony with the surrounding landscape.

8.2 Scoring Items

I Site Ecology and Landscape

- 8.2.1** Fully protect or restore the ecological environment of the site, and rationally arrange the buildings and landscape, which is scored according to the following criteria, totally 10 points:
- 1** Protect the original natural water areas, wetlands, vegetation, etc. in the site to maintain the continuity of the ecosystem inside and outside of the site, which is scored 10 points.
 - 2** Take ecological compensation measures such as recovery and utilization of topsoil, which is scored 10 points.
 - 3** According to the actual situation of the site, take other ecological restoration or compensation measures, which is scored 10 points.
- 8.2.2** Plan the rainwater runoff of ground surface and building roof of the site, and control the total discharge of the site rainwater, which is totally scored 10 points. The volume capture ratio of annual rainfall of the site reaches 55%, which is scored 5 points; it reaches 70%, which is scored 10 points.
- 8.2.3** Make full use of the space to set up green space, which is scored according to the following criteria, totally 16 points:
- 1** Residential building is respectively scored and accumulated according to the following criteria:

- 1) The green space rate reaches 105% and above of the planning index, which is scored 10 points;
- 2) Per capita concentrated green space in neighborhood block where residential building locates is scored according to the criteria specified in Table 8. 2. 3, and at most 6 points.

Table 8. 2. 3 Scoring criteria for per capita concentrated green space for residential building

Per capita concentrated green space A_g (m^2 /person)		Score (points)
New area construction	Old area renovation	
0. 50	0. 35	2
$0. 50 < A_g < 0. 60$	$0. 35 < A_g < 0. 45$	4
$A_g \geq 0. 60$	$A_g \geq 0. 45$	6

2 Public buildings are respectively scored and accumulated according to the following criteria;

- 1) The green space rate of public buildings reaches 105% and above of the planning index, which is scored 10 points;
- 2) Green space is open to the public, which is scored 6 points.

8. 2. 4 The layout of outdoor smoking area is reasonable, which is respectively scored and accumulated according to the following criteria, totally 9 points;

1 The outdoor smoking area is arranged at the downwind of the dominant wind at the main entrance/exit of the building, with a distance of not less than 8m from all building entrances/exits, fresh air intakes and openable windows as well as the activity space of children and the elderly, which is scored 5 points;

2 The outdoor smoking area, with warning sign "smoking is harmful to health", is arranged in combination with green plants, where seats and the litter bins with the cigarette butts collection function are reasonably allocated while completed guiding signs and conspicuous positioning marks from the main entrance of the building to the outdoor smoking area are equipped, which is scored 4 points.

8. 2. 5 Make use of site space to provide green infrastructure for rainwater, which is respectively scored and accumulated according to the following criteria, totally 15 points;

1 The area of the green space and the waterscape, with the function of storing rainwater, such as the sunken lawn and the rain garden, accounts for 40% of the green area, which is scored 3 points; it reaches 60%, which is scored 5 points;

2 Not less than 80% of roof rainwater are converged and led into the overground ecological facilities, which is scored 3 points;

3 Not less than 80% of road rainwater are converged and led into the overground ecological facilities, which is scored 4 points;

4 Ratio of permeable pavement area in rigid pavement reaches 50%, which is scored 3 points.

II Outdoor Physical Environment

8. 2. 6 The ambient noise in the site is superior to the requirements stipulated in the current national standard GB 3096 *Environmental quality standard for noise*, which is scored according to the following criteria, totally 10 points:

1 The ambient noise value is greater than the standard limit value of Class 2 acoustic environment functional areas, and less than or equal to the standard limit value of Class 3 acoustic environment functional areas, which is scored 5 points.

2 The ambient noise value is less than or equal to the standard limit value of Class 2 acoustic environment functional areas, which is scored 10 points.

8.2.7 Avoid light pollution in building and lighting design, which is scored and respectively accumulated according to the following criteria, totally 10 points:

1 The visible light reflectance of the glass curtain wall and the influence of the reflected light on the surrounding environment meet the requirements of GB/T 18091 *Optical and thermal performance of glass curtain wall*, which is scored 5 points;

2 Restrictions on light pollution of outdoor nightscape lighting is in accordance with the requirements stipulated in the current national standard GB/T 35626 *Specification for limitation to obtrusive light of outdoor lighting* and the current professional standard JGJ/T 163 *Code for lighting design of urban nightscape*, which is scored 5 points.

8.2.8 Wind environment in the site is conducive to travel and move outdoors and natural ventilation of buildings, which is respectively scored and accumulated according to the following criteria, totally 10 points:

1 The corresponding typical wind speed and wind direction in winter is scored and accumulated according to the following criteria:

- 1) Wind speed is less than 5m/s in pedestrian area at a height of 1.5m around the building and less than 2m/s in outdoor rest area and children's entertainment area, and amplification coefficient of wind speed is less than 2, which is scored 3 points;
- 2) The air pressure difference between windward side and leeward side is not greater than 5Pa with the exception of the first row of windward buildings, which is scored 2 points.

2 The corresponding typical wind speed and wind direction in transition season and summer is scored and accumulated according to the following criteria:

- 1) No eddy or calm zone occurs in the activity areas of the site, which is scored 3 points;
- 2) Air pressure difference between interior and exterior surfaces of above 50% pivoted external window is greater than 0.5Pa, which is scored 2 points.

8.2.9 Take measures to reduce the heat island intensity, which is respectively scored and accumulated according to the following criteria, totally 10 points:

1 In the site, the ratio of the shadow area of outdoor activity sites such as footpaths, recreation grounds, courtyards and squares outside the shadow area of the building that are provided with shading measures such as trees, flower frames, reaches 30% for residential buildings and 10% for public buildings, which is scored 2 points; it reaches 50% for residential buildings and 20% for public buildings, which is scored 3 points;

2 For the motor vehicle lane outside the shadow area of the building in the site, the reflection coefficient of solar radiation for road surface is not less than 0.4 or more than 70% of the road is under the large shadow of trees, which is scored 3 points;

3 Sum area of the green area of the roof, the horizontal projection area of solar panels and the roof area with the reflection coefficient of solar radiation not less than 0.4 account for 75%, which is scored 4 points.

9 Promotion and Innovation

9.1 General Requirements

9.1.1 In the assessment of green building, promotion and innovation items shall be assessed according to the provisions of this chapter.

9.1.2 The score of promotion and innovation is the sum of the score of bonus points. When the sum is more than 100 points, the score shall be 100 points.

9.2 Bonus Items

9.2.1 Take measures to further reduce the energy consumption of heating and air conditioning system in the building, which is scored totally 30 points. The energy consumption of heating and air conditioning system in the building is 40% lower than that stipulated in the current relevant standards of the nation for building energy efficiency design, which is scored 10 points; for each 10% reduction, 5 points are added; at most 30 points.

9.2.2 Adopt architectural style design with appropriate regional characteristics and inherit regional architectural culture according to local conditions, which is scored 20 points.

9.2.3 Reasonably choose the abandoned site for construction, or make full use of the usable old buildings, which is scored 8 points.

9.2.4 Green capacity rate is not lower than 3.0, which is scored according to the following criteria, totally 5 points:

1 The calculated value of the site's green capacity rate is not less than 3.0, which is scored 3 points.

2 The measured value of the site's green capacity rate is not less than 3.0, which is scored 5 points.

9.2.5 Adopt structural system and building components that meet the requirements for industrialized construction, which is scored according to the following criteria, totally 10 points:

1 Steel structure or timber structure is adopted for the main structure, which is scored 10 points.

2 Precast concrete structure is adopted for the main structure. The ratio of the volume of concrete used in precast components to the total volume of the concrete above the ground reaches 35%, which is scored 5 points; it reaches 50%, which is scored 10 points.

9.2.6 Application of Building Information Modeling (BIM) technology is totally scored 15 points. It is applied in any stage of the planning and design, the construction and building, operation and maintenance, which is scored 5 points; it is applied in two stages, which is scored 10 points; it is applied in three stages, which is scored 15 points.

9.2.7 Computing and analysing building carbon emission is performed and measures are taken to reduce the carbon emission intensity in unit building floor area, which is scored 12 points.

9.2.8 Construction and management is carried out according to the requirements of green construction, which is respectively scored and accumulated according to the following criteria,

totally 20 points;

1 Obtain the fine grade for green construction or the green construction demonstration project is awarded, which is scored 8 points.

2 Take measures to reduce the loss of ready-mixed concrete and the loss rate is reduced to 1.0%, which is scored 4 points;

3 Take measures to reduce the loss of on-site processed rebars, and the loss rate is reduced to 1.5%, which is scored 4 points;

4 The cast-in-place concrete member adopts a template system of wall finishing free like aluminum mold, which is scored 4 points.

9.2.9 Inherent Defect Insurance of construction engineering quality is used, which is respectively scored and accumulated according to the following criteria, totally 20 points;

1 Insurance coverage includes quality problems of foundation engineering, main structural engineering, roof waterproof engineering and other civil engineering constructions, which is scored 10 points;

2 Insurance coverage includes quality problems of decoration engineering, electrical pipelines, water supply and drainage pipelines, and heating and cooling systems, which is scored 10 points.

9.2.10 Take other innovation measures such as saving resources, protecting ecological environment, ensuring safety and health, operating smartly and friendly, inheriting history and culture, and have obvious benefits, which is totally scored 40 points. Each mentioned innovation measure is taken, which is scored 10 points; at most 40 points.

Explanation of Wording in This Standard

1 Words used for different degrees of strictness are explained as follows in order to mark the differences in implementing the requirements of this standard:

1) Words denoting a very strict or mandatory requirement:

“Must” is used for affirmation; “must not” for negation;

2) Words denoting a strict requirement under normal conditions:

“Shall” is used for affirmation; “shall not” for negation;

3) Words denoting a permission of a slight choice or an indication of the most suitable choice when conditions permit:

“Should” is used for affirmation; “should not” for negation;

4) “May” is used to express the option available, sometimes with the conditional permit.

2 “Shall comply with…” or “shall meet the requirements of…” is used in this standard to indicate that it is necessary to comply with the requirements stipulated in other relative standards and codes.

List of Quoted Standards

- 1 GB 50034 *Standard for lighting design of buildings*
- 2 GB 50118 *Code for design of sound insulation of civil buildings*
- 3 GB 50176 *Code for thermal design of civil building*
- 4 GB 50189 *Design standard for energy efficiency of public buildings*
- 5 GB 50555 *Standard for water saving design in civil building*
- 6 GB 50736 *Design code for heating ventilation and air conditioning of civil buildings*
- 7 GB/T 50785 *Evaluation standard for indoor thermal environment in civil buildings*
- 8 GB 3096 *Environmental quality standard for noise*
- 9 GB 5749 *Standards for drinking water quality*
- 10 GB/T 18091 *Optical and thermal performance of glass curtain wall*
- 11 GB/T 18883 *Indoor air quality standard*
- 12 GB/T 20145 *Photobiological safety of lamps and lamp systems*
- 13 GB/T 31831 *Technical requirements for application of LED indoor lighting*
- 14 GB/T 35626 *Specification for limitation to obtrusive light of outdoor lighting*
- 15 JGJ/T 163 *Code for lighting design of urban nightscape*
- 16 JGJ/T 331 *Technical specification for slip resistance of building floor*