Assessment standard for green building

T/CECS X-20XX

**Contents**

[**1 General provisions** 1](#_Toc93496549)

[**2 Terms** 2](#_Toc93496550)

[**3 Basic Requirements** 3](#_Toc93496551)

[**3.1 General Requirements** 3](#_Toc93496552)

[**3.2 Assessment and Rating** 3](#_Toc93496553)

[**4 Safety and Durability** 4](#_Toc93496554)

[**4.1 Prerequisite Items** 4](#_Toc93496555)

[**4.2 Scoring Items** 5](#_Toc93496556)

[**5 Health and Comfort** 7](#_Toc93496557)

[**5.1 Prerequisite Items** 7](#_Toc93496558)

[**5.2 Scoring Items** 8](#_Toc93496559)

[**6 Occupant Convenience** 14](#_Toc93496560)

[**6.1 Prerequisite Items** 14](#_Toc93496561)

[**6.2 Scoring Items** 14](#_Toc93496562)

[**7 Resources Saving** 19](#_Toc93496563)

[**7.1 Prerequisite Items** 19](#_Toc93496564)

[**7.2 Scoring Items** 20](#_Toc93496565)

[**8 Environment Livability** 25](#_Toc93496566)

[**8.1 Prerequisite Items** 25](#_Toc93496567)

[**8.2 Scoring Items** 26](#_Toc93496568)

[**9 Openness and Innovation** 29](#_Toc93496569)

[**9.1 General Requirements** 29](#_Toc93496570)

[**9.2 Bonus Items** 29](#_Toc93496571)

**1 General provisions**

1. This standard is prepared with a view to implement the concept of green development, promote the high-quality development, save resources, protect the environment, reduce carbon emissions from construction, promote harmony between man and nature, improve the living environment in countries along the Silk Road Economic Belt and the 21st-Century Maritime Silk Road, and support the promotion of green buildings in those countries
2. This standard is applicable to the assessment on the green performance of civil buildings in countries along the Silk Road Economic Belt and the 21st-Century Maritime Silk Road.
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. of the country or region 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.
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.
5. In addition to the requirements stipulated in this standard, the assessment of green building shall comply with those stipulated in the current relevant local standards.

**2 Terms**

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.

1. 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.

1. Water Quality Regular Indices

The water quality index that can reflect the basic condition of drinking water quality

1. Weighted Standardized Level Difference

The single number quantity of the airborne sound insulation performance between two rooms obtained by using the reverberation time of the receiving room as a modified parameter.

1. Value Of Daylight Factor

The ratio of illuminance directly or indirectly received from the assumed and known distributed diffuse sky light from at a point on the indoors working plane to the simultaneous outdoor illuminance on a horizontal plane from an unobstructed hemisphere of overcast sky.

1. Lighting Power Density

Installation power per unit area of general lighting (including auxiliary electrical devices such as light sources, ballasts or transformers) in watts per square meter (W/m2).

1. Bioclimatic Design

Architectural design method that consistent with the local natural environment, which can promote environmental sustainability and bring people pleasant and comfort.

1. 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.

1. 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.

**3 Basic Requirements**

**3.1 General Requirements**

1. Assessment of green building shall take a single building or a group of buildings as the assessed object; the assessment indexes involving systemic and holistic characteristics shall be based on the overall project to which the building belongs.
2. The assessment of green building includes two parts: Pre-assessment shall be conducted after the completion of the construction drawing design; assessment shall be conducted after construction.
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, equipment 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.
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.
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**

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.
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. As for a multifunctional 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.
4. The scores of green building assessment shall be in accordance with the requirements specified in Table 3. 2.4

**表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 doe 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 |

1. 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 （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~*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 openness and innovation.

1. Green buildings shall be divided into four grades: basic, one-star, two-star and three-star.
2. When the requirements of all prerequisite items are met, the green building grade shall be the basic grade.
3. 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** When the total score reaches 60 points, 70 points, 85 points respectively, the green buildings are rated as the grade of one-star, two-star and three-star respectively

**4 Safety and Durability**

**4.1 Prerequisite Items**

1. Sites with geological risks such as landslides and mudslides shall be avoided. Flood-prone areas shall be provided with flood-proof infrastructure, termite prevention and control shall be done in areas vulnerable to termite infestation; 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.
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.
3. The exterior doors and windows of the building must be installed firmly, and its wind load resistance performance and water tightness performance shall meet the functional requirements of the building, and adapt to the local environment.
4. 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.
5. Passage spaces such as corridors and evacuation passages shall meet the requirements of emergency evacuation and emergency rescue, and shall be kept unblocked.
6. The warning and guidance signage system for safety protection shall be installed in the building.

**4.2 Scoring Items**

**Ⅰ Safety**

1. The adoption of performance-based seismic design and the rational improvement of the seismic performance of the building are totally scored 10 points.
2. Take protective measures to ensure people's safety, which is respectively scored and accumulated according to the following criteria, totally 12 points:

**1** Take measures to improve the protection level of balcony, exterior window, windowsill, balustrade, etc., which is scored 4 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 4 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 4 points.

1. 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.

1. Take anti-slip measures for indoor and outdoor floors or road surfaces, which is respectively scored and accumulated according to the following criteria, totally 9 points:

**1** Take anti-slip measures for building entrances and exits, platforms, public corridors, elevator halls, kitchens, bathrooms, toilets, etc. , the anti-skid level shall not be lower than Bd and Bw in Table 4.2.4-1 and 4.2.4-2, which is scored 3 points;

**2** As for anti-slip ground for indoor and outdoor activities, the anti-slip level reaches Ad and Aw level in Table 4.2.4-1 and 4.2.4-2, which is scored 3 points;

**3** The anti-slip level of construction ramps and stair steps reaches Ad and Aw in Table 4.2.4-1 and 4.2.4-2, 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.

Table 4.2.4-1 Wet slip resistance values of outdoor and indoor wet floors

|  |  |  |
| --- | --- | --- |
| Anti-slip level | Safety degree of anti-slip | Anti-slip value BPN |
| Aw | High | BPN≥80 |
| Bw | Medium to high | 60≤BPN＜80 |
| Cw | Middle | 45≤BPN＜60 |
| Dw | Low | BPN＜45 |

Table 4.2.4-2 Static friction coefficient of indoor dry ground

|  |  |  |
| --- | --- | --- |
| Anti-slip level | Safety degree of anti-slip | Static friction coefficient COF |
| Ad | High | COF≥0.70 |
| Bd | Medium to high | 0.60≤COF＜0.70 |
| Cd | Middle | 0.50≤COF＜0.60 |
| Dd | Low | COF＜0.50 |

1. Separate pedestrian system from vehicle system, and provide the walking and bicycle transportation system with sufficient lighting, which is scored 5 points.
2. Video surveillance system is set in public areas, which is scored 10 points.

**Ⅱ Durability**

1. Take measures to improve the structural adaptability of buildings, which is relatively scored and accumulated according to the following criteria, totally 15 points:

**1** Take a general open, flexible and variable space design, or adopt measures of variable building function, which is scored 5 points;

**2** The building structure is separated from the construction equipment pipeline, which is scored 5 points;

**3** Adopt layout or control methods of equipment facilities that are compatible with building functions and spatial changes, which is scored 5 points.

1. 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.

1. 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 or weather-resistant anticorrosive coatings;

3) For wood members, use anti-corrosive wood, durable wood or durable wood products.

1. 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**

1. The concentration of pollutants such as formaldehyde, benzene and total volatile organic compounds in indoor air shall meet the requirements of the relevant local standards. Smoke-free management in the building shall comply with local requirements.
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.
3. The setting of water supply and drainage system shall be in accordance with the following requirements:

**1** The conventional indicators and limits of the quality of drinking water shall meet the requirements of relevant local standards;

**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.

1. Reasonable planning and arrangement of site and indoor acoustic environment shall be carried out, which shall be in accordance with the following requirements:

**1** The noise source areas and noise sensitive areas in the project shall be reasonably planned and arranged.

**2** The functional areas in the building shall be rationally planned and arranged according to the acoustic environment space.

1. The quantity and quality of building lighting shall meet the requirements of local standards.
2. 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 local standards.
3. 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** Comply with relevant local standards to avoid overheating in summer.

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

**5.2 Scoring Items**

**Ⅰ Indoor Air Quality**

1. Control the concentration of main air pollutants in the room, which is respectively scored and accumulated according to the following criteria, totally 10 points：

**1** The concentration of major pollutants is 10% lower than the limit stipulated in the relevant local standards, which is scored 3 points; it is 20% lower than the limits, which is scored 6 points;

**2** The annual average concentration of PM2.5 in the room is not higher than 15µg/m³, and the annual average concentration of PM10 in the room is not higher than 30µg/m³, which is scored 4 points.

1. The design minimum fresh air volume in the room complies with the calculation result of Eq. (5.2.2), which is scored 5 points.

=*n*×+*A*× （5.2.2）

Where: ——the total ventilation rate for the breathing zone, L/s;

n——the design value for the number of the persons in the room;

——the ventilation rate for occupancy per person, L/(s·person);

A——the floor area, m2;

——the ventilation rate for emissions from building, L/(s·m2).

Table 5.2.2-1 Design Ventilation Rates for Persons for Different Categories

|  |  |  |
| --- | --- | --- |
| Category | Expected percentage dissatisfied  （%） | Airflow per person  [L/(s·person)] |
| Ι | 15 | 10 |
| Π | 20 | 7 |
| Ш | 30 | 4 |
| Ⅳ | 40 | 2.5 |

Table 5.2.2-2 Design Ventilation Rates for Diluting Emissions of

Different Type of Buildings

|  |  |  |  |
| --- | --- | --- | --- |
| Category | Very low polluting building  [L/(s·m2)] | Low polluting building  [L/(s·m2)] | Non low polluting building  [L/(s·m2)] |
| Ι | 0.5 | 1.0 | 2.0 |
| Π | 0.35 | 0.7 | 1.4 |
| Ш | 0.2 | 0.4 | 0.8 |
| Ⅳ | 0.15 | 0.3 | 0.6 |

1. The underground garage shall be equipped with a carbon monoxide concentration monitoring device linked to the exhaust equipment, which is scored 8 points.

**Ⅱ Water Quality**

1. The water quality of fine drinking water, central domestic hot water, swimming pool water, etc. meet the requirements stipulated in the relevant local standards, which is scored 8 points.
2. 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 the following criteria, totally 9 points:

**1** Use the finished product water tank that meets the requirements stipulated in the relevant local standards, which is scored 5 points;

**2** Take measures to ensure that the stored water does not deteriorate, which is scored 4 points.

1. 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**

1. The indoor noise level of the main functional room is better than the limit of the relevant local standards, which is scored according to the following criteria, totally 8 points:

**1** The indoor noise level of the main functional room is 3dB lower than the current local standard limit, or meet the good standard limit stipulate in table 5.2.7, which is scored 4 points;

**2** The indoor noise level of the main functional room is 5dB lower than the current local standard limit, or meet the best standard limit stipulate in table 5.2.7, which is scored 8 points.

Table 5.2.7 Standard Limit of Indoor Noise Level

|  |  |  |  |
| --- | --- | --- | --- |
| Main function room | | Good standard limit | Best standard limit |
| Residential building | Bedroom | ≤32dB, *L*Aeq，T（nighttime） | ≤30dB, *L*Aeq，T（nighttime） |
| Living room | ≤37dB, *L*Aeq，T | ≤35dB, *L*Aeq，T |
| School  buildings | Common classroom、Laboratory、Multimedia Classroom、Dance room | ≤42dB, *L*Aeq，T | ≤40dB, *L*Aeq，T |
| Language classroom、Reading room、Music classroom、Piano room | ≤37dB, *L*Aeq，T | ≤35dB, *L*Aeq，T |
| Hospital  buildings | Ward、Medical staff duty room、ICU | ≤32dB, *L*Aeq，T（nighttime） | ≤30dB, *L*Aeq，T（nighttime） |
| Clinic、Operating room、Delivery room、Laboratory、Analytical laboratory | ≤37dB, *L*Aeq，T | ≤35dB, *L*Aeq，T |
| Clean operating room | ≤42dB, *L*Aeq，T | ≤40dB, *L*Aeq，T |
| Artificial reproduction center purification area | ≤37dB, *L*Aeq，T | ≤35dB, *L*Aeq，T |
| Entrance hall、Waiting room | ≤52dB, *L*Aeq，T | ≤50dB, *L*Aeq，T |
| Hotel  buildings | Guest room | ≤32dB, *L*Aeq，T（nighttime） | ≤30dB, *L*Aeq，T（nighttime |
| Office、Meeting room、Multipurpose hall | ≤37dB, *L*Aeq，T | ≤35dB, *L*Aeq，T |
| Dinning room、Ballroom、Hotel lobby | ≤45dB, *L*Aeq，T | ≤43dB, *L*Aeq，T |
| Office buildings | Single office | ≤37dB, *L*Aeq，T | ≤35dB, *L*Aeq，T |
| Multi-person office、Meeting room | ≤42dB, *L*Aeq，T | ≤40dB, *L*Aeq，T |
| Commercial buildings | Shopping mall、Store、Shopping center、Exhibition Center | ≤52dB, *L*Aeq，T | ≤50dB, *L*Aeq，T |
| Restaurant | ≤50dB, *L*Aeq，T | ≤45dB, *L*Aeq，T |
| Staff lounge | ≤42dB, *L*Aeq，T | ≤40dB, *L*Aeq，T |

1. The sound insulation performance of the main functional rooms is better than the relevant local standards, which is respectively scored and accumulated according to the following criteria, totally 10 points:

**1** The air sound insulation performance between rooms is 2 dB better than the current local standard limit, or meet the good standard limit in table 5.2.8-1, which is scored 3 points; 5 dB better than the current local standard limit, or meet the best standard limit in table 5.2.8-1, which is scored 5 points;

**2** The impact sound insulation performance of the floor slab is 2dB better than the current local standard limit, or meet the good standard limit in table 5.2.8-2, which is scored 3 points; 5 dB better than the current local standard limit, or meet the best standard limit in table 5.2.8-2, which is scored 5 points;

Table 5.2.8-1 Standard Limits for Airborne Sound Insulation Performance

between Rooms

|  |  |  |  |
| --- | --- | --- | --- |
| Building type | Component / Room | Good standard limit | Best standard limit |
| Residential buildings | Between bedroom and neighboring room | *D*nT，w+*C*≥52 dB | *D*nT，w+*C*≥55 dB |
| Between living room and neighboring room | *D*nT，w+*C*≥50 dB | *D*nT，w+*C*≥53 dB |
| Bedroom with window on exterior wall | *D*2m，nT，w+*C*tr≥37dB | *D*2m，nT，w+*C*tr≥40dB |
| School  buildings | Between common classrooms | *D*nT，w+*C*≥47 dB | *D*nT，w+*C*≥50 dB |
| Between language classrooms, reading rooms and adjacent rooms | *D*nT，w+*C*≥52 dB | — |
| Hospital  buildings | Between wards | *D*nT，w+*C*≥47 dB | *D*nT，w+*C*≥50 dB |
| Between clinics | *D*nT，w+*C*≥42dB | *D*nT，w+*C*≥45 dB |
| Hotel  buildings | Between rooms | *D*nT，w+*C*≥50dB | *D*nT，w+*C*≥53 dB |
| Guest room with window on exterior wall and glass curtain wall | *D*2m, nT, w+*C*tr≥37dB | *D*2m，nT，w+*C*tr≥40dB |
| Office  buildings | Between offices, meeting rooms and common rooms | *D*nT，w+*C*≥47dB | *D*nT，w+*C*≥50 dB |
| Commercial buildings | Between fitness centers, entertainment venues, etc. and noise-sensitive rooms | *D*nT，w+*C*tr≥57dB | *D*nTw+*C*tr≥60dB |
| Between shopping centers, restaurants, convention centers, etc. and noise-sensitive rooms | *D*nT，w+*C*tr≥47dB | *D*nTw+*C*tr≥50dB |

Table 5.2.8-2 Standard Limit of Floor Impact Sound Insulation Performance

|  |  |  |  |
| --- | --- | --- | --- |
| Building type | Floor position | Good standard limit | Best standard limit |
| Residential buildings | Household floor of bedroom and  living room | *L*’nT，w≤62 dB | *L*’nT，w≤60 dB |
| School  buildings | Floor slabs between speech classroom, reading room and upper room | *L*’nT，w≤62 dB | *L*’nT，w≤60 dB |
| Floor between common classrooms | *L*’nT，w≤67 dB | *L*’nT，w≤65 dB |
| Hospital  buildings | Floor slabs between wards, operating theatres and upper rooms | *L*’nT，w≤67 dB | *L*’nT，w≤65 dB |
| Hotel  buildings | Floor slabs between guest room and upper room | *L*’nT，w≤62 dB | *L*’nT，w≤60 dB |
| Office  buildings | Floor slabs on top of offices, meeting rooms | *L*’nT，w≤67 dB | *L*’nT，w≤65 dB |
| Commercial buildings | Floor slabs between fitness centers, entertainment venues, etc. and noise-sensitive rooms | *L*’nT，w≤47 dB | *L*’nT，w≤45 dB |

1. Make full use of daylighting, which is respectively scored and accumulated according to the following criteria, totally 9 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**

1. 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, 60% of the main function rooms are thermally comfortable to meet the requirements in Table 5.2.10, which is scored 5 points; for each additional 10%, 1 point is added, at most 8 points.

Table 5.2.10 Requirements of Thermal Comfort

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Thermal state of the body  as a whole | | Local discomfort | | | |
| *PMV* | *PPD*（%） | *DR*（%） | *PD*（%）caused by | | |
| vertical air temperature difference | Cwarm or cool floor | Rradiant asymmetry |
| -0.7＜*PMV*＜0.7 | ＜15 | ＜30 | ＜10 | ＜15 | ＜10 |

1. 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 10% in the tropical areas, and 5% in other areas, which is scored 5 points; for each additional 2%, 1 point is added, at most 8 points;

**2** Non-residential buildings: The location of the air supply and exhaust vents shall consider the depth (W: m) and height (H: m) of the room, and meet the requirements in Table 5.2.11, which is scored 8 points.

Table 5.2.11 Natural Ventilation Strategies for Non-residential Buildings

|  |  |
| --- | --- |
| Vent form | Ratio of room depth to floor and ceiling height *W/H* |
| A vent on one side of the façade | *W/H*≤2 |
| Two vent on one side of the façade | *W/H*≤2.5 |
| One vent on each of the opposite façades | *W/H*≤5 |

1. 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 5.2.12, totally 9 points.

Table 5.2.12 Scoring Criteria for the Proportion of the Area of Adjustable Shading Facilities in the Transparent Part of the Exterior Window

|  |  |
| --- | --- |
| Proportion of the area of adjustable shading facilities in the transparent part of the exterior window, *S*Z | Score (Points) |
| 25%*≤S*Z<35% | 3 |
| 35%*≤S*Z<45% | 5 |
| 45%*≤S*Z<55% | 7 |
| *S*Z≥55% | 9 |

**6 Occupant Convenience**

**6.1 Prerequisite Items**

1. Accessible barrier-free walking system shall be provided between buildings, outdoor sites, public green spaces and urban roads.
2. The parking lot shall be equipped with the charging facilities of new energy vehicle or the installation conditions of the charging facilities, and rationally provided with the parking space for new energy car and the barrier-free car.
3. Non-motorized vehicle parking lot shall be located in a rational and convenient place. The parking lot shall be equipped with lighting and charging facilities and rain and snow protection facilities.

**6.2 Scoring Items**

**Ⅰ Transit and Accessibility**

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 score for connection between site entrance and different public transportation are detailed in Table 6.2.1

Table 6.2.1 Scoring table for connection between site and public transportation

| Public Transportation Type | Public Transportation Sub-type | Criteria 1 | | Criteria 2 | |
| --- | --- | --- | --- | --- | --- |
| Walking Distance | Score | Walking Distance | Score |
| Bus Stop | Bus, Street Car, Bus Rapid Transit | 500m | 2 | 300m | 4 |
| Rail Transit Station | Regional Railways, Intercity Railway, Municipal Railway, Municipal Express, Subway | 800m | 500m |
| Commuter ferry terminal | Water Bus, Channel Ferry, Cruise Yachts | 800m | 500m |
| Special Shuttle Bus to Public Transportation Station | Bus, Taxi, Shuttle Bus, Mini-Bus, Locally specific mobility（motorcycle, electric tricycle） | 500m | 300m |
| Note：  The connection between the site and public transportation can be determined according to criteria 1 or 2. When the walking distance between the entrance of the site and any of the public transportation types in Table 6.2.1-1 meets criteria 1, 2 points are awarded, and 4 points are awarded if the criteria 2 is met.  A special shuttle bus refers to a vehicle that is connected to a public transportation station, can provide regular fixed-point services, and has been publicized to the user to provide legal and compliant transportation services. | | | | | |

**2** There are no less than 2 types of public transportation routes within 800m walking distance of the entrance of the site, 4 points are awarded.

1. 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 Water Quality**

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

**1** Convenient public service facilities are provided around residential building sites, as scored in Table 6.2.3-1 and Table 6.2.3-2.

Table 6.2.3-1 Scoring table for convenient public services of residential buildings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Standards | High-density residential buildings | | Low-density residential buildings | |
| The number of public service facilities that meet the requirements in Table 6.2.3-2 | No less than 5 items | No less than 7 items | No less than 4 items | No less than 6 items |
| Score | 5 | 10 | 5 | 10 |

Table 6.2.3-2 Requirements for convenient public services

|  |  |  |  |
| --- | --- | --- | --- |
| NO. | Public Services | | Distance from the entrance of the site |
| Category | Items |
| 1 | Food and daily necessities supply facilities | Food Store, Convenience store | 300m |
| Shopping malls, wet markets or fresh supermarkets, etc. | 500m |
| 2 | Public or private educational facilities | Kindergarten（daycare） | 300m |
| Elementary School | 500m |
| Secondary School | 1000m |
| 3 | Public or private health facilities | Community health service stations, community health service centers, over-the-counter drug service areas, public clinics or general medical centers | 1000m |
| 4 | Community service facilities | Community service centers, day care centers for the elderly, nursing homes | 500m |
| 5 | Cultural facilities | Cultural center, cultural palace, cultural activity center (including youth activity station, elderly activity station), library, gallery | 500m |
| 6 | Sports facilities | Stadiums (pavilions), multi-functional sports venues | 500m |
| 7 | Recreational facilities | Leisure facilities such as cinemas and theaters | 500m |
| 8 | Commercial service facilities | Gyms, catering facilities, bank outlets, telecommunications outlets, postal establishments, ATMs | 500m |

**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.

1. 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.

1. 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**

1. 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.
2. Set the air quality monitoring system of PM10, PM2.5, 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.
3. 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.

1. 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 Facility Management**

1. 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 facility management agency includes appraisal incentive mechanisms for energy-saving and water-saving performance, which is scored 3 points.

1. The average daily water consumption of the building meets the requirements of the rated water consumption for water saving stipulated in the current relevant local standard.
2. 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, incorporate relevant changes made in the operations process into the Operations and Maintenance Manual, 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.

1. 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** Entrust a third party to carry out user satisfaction survey for the green performance of the building once a year. Formulate improvement measures base on the survey results and implement and publicize them, which is scored 3 points.

**7 Resources Saving**

**7.1 Prerequisite Items**

1. The building shall be designed for improving the performance, reducing the energy demand, evaluating the bioclimatic design.

**1** The project design (shape, plane layout, glass façade orientation, bioclimatology, etc.) shall be explained according to the background and function of the building.

**2** The energy demand (heating, cooling, lighting) shall be reduced through dynamic simulation calculation.

1. The feasibility study on the utilization of renewable energy shall be conducted, including the project’s objectives, application scenarios, and analysis of technical and economic conditions.
2. Measures shall be taken to reduce energy consumption of space heating and air conditioning systems, and shall meet the following requirements:

**1** The orientation of the room shall be distinguished; the space heating and air conditioning areas shall be subdivided and controlled in system zoning.

**2** The performance indicators of the cold and heat source equipment shall meet the requirements of the national energy saving standards of the building.

1. Lighting power density in the main functional rooms shall not be higher than the current values stipulated in the national architectural lighting design standard of the building’s country; and for the lighting system in the public area, energy-saving control measures, i.e., zoning, time setting and induction, shall be taken; the lighting of daylighting area shall be controlled independently.
2. Water resource utilization method shall be developed to make overall use of various water resources, and shall meet the following requirements:

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

**2** Water appliances and equipment shall meet the requirements of water-saving products.

1. Construction materials and products prohibited or restricted from use shall not be used.

**7.2 Scoring Items**

**Ⅰ Land Saving and Land Utilization**

1. The land utilization is economically and intensively, which is scored based on the spatial efficiency coefficient, according to Table 7.2.1, totally 20 points.

Table 7.2.1 Scoring criteria for spatial efficiency coefficient

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Residence | Office, education, hotel | Shopping malls, department stores | Consumer market | Score  (points) |
| S≤0.60 | S≤0.45 | S≤0.50 | S≤0.70 | 10 |
| 0.60<S<0.80 | 0.45<S<0.73 | 0.45<S<0.70 | 0.70<S<0.90 | 15 |
| S≥0.80 | S≥0.73 | S≥0.70 | S≥0.90 | 20 |

1. Rationally develop and utilize underground space which is scored according to the 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

|  |  |  |  |
| --- | --- | --- | --- |
| Building type | Underground space development and utilization index | | Score  (points) |
| Residential building | Ratio of underground building floor area to above-ground buildings floor area Rr  Ratio of first underground storey building floor area to total construction land area RP | 5%≤Rr＜20% | 5 |
| Rr≥20% | 7 |
| Rr≥35%  and RP＜60% | 12 |
| Public building | Ratio of underground building floor area to total construction land area RP1  Ratio of first underground storey building floor area to total construction land area RP | RP1≥0.5 | 5 |
| RP1≥0.7  and RP＜70% | 7 |
| RP1≥1.0  and RP＜60% | 12 |

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

**1** The ratio of the number of 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**

1. Optimize the thermal performance of building envelope, which is scored according to the following criteria, totally 8 points:

**1** The thermal performance of the 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 4 points; it is improved up to 10％, which is scored 8 points;

**2** The annual calculated load for building heating and air conditioning is reduced up to 5%, which is scored 4 points; it is reduced up to 10%, which is scored 8 points.

1. Take measures to reduce the energy consumption of air-conditioning system under partial load and partial space application. Integrated part load value (IPLV) and system coefficient of refrigeration performance (SCOP) meet the current energy saving standards of the building’s location, which is scored 5 points.
2. The energy efficiency of both cold and heat source unit of the space heating and air conditioning system is superior to the requirements stipulated in the relevant current national energy saving standards of the building. The energy efficiency index of cold and heat source is improved up to 5%, which is scored 4 points; it is improved up to 10%, which is scored 8 points. If there are no national requirements, give scores according to the criteria specified in Table 7.2.6-1.

Table 7.2.6-1 Scoring criteria for increasing degree of energy efficiency indexes of cold and heat source unit

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Unit type | | Energy efficiency index | Score requirements | |
| Vapor compression cycle water chiller (heat pump) unit driven by motor | | Coefficient of performance (COP) for cooling | Increasing by 6% | Increasing by 12% |
| Li Br absorption cold(warm) water unit | | Coefficient of performance (COP) for cooling and heating | Increasing by 6% | Increasing by 12% |
| Unitary air conditioner, duct and roof-type air conditioning units | | Energy efficiency ratio(EER) | Increasing by 6% | Increasing by 12% |
| Multi-connected air-conditioning (heat pump) unit | | Integrated part load value [IPLV（C）] | Increasing by 8% | Increasing by 16% |
| Boiler | Fuel | Thermal efficiency(*η*) | Increasing by 10% | Increasing by 20% |
| Oil and gas | Thermal efficiency(*η*) | Increasing by 10% | Increasing by 20% |
| Room air conditioner | | Energy efficiency ratio(EER) | Increasing by 8% | Increasing by 20% |
| Home gas-fired water heater | | Thermal efficiency(*η*) | Increasing by 5% | Increasing by 10% |
| Score(points) | | | 4 | 8 |

1. 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 8 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 energy saving standard of the building, which is scored 4 points;

**2** The electricity consumption to transferred heat quantity ratio of the 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 energy saving standard of the building, which is scored 4 points.

1. 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 8 points:

**1** Lighting power density of the main functional rooms reach 90% of the values stipulated in the current lighting standard of the building’s location, which is scored 3 points;

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

**3** Lighting products, three-phase distribution transformers, pumps, fans, elevators and other equipment meet the requirements of energy-saving assessment values stipulated in the current national energy-saving standard of the building, which is scored 3 points.

1. Energy consumption for cold and heat sources, distribution system and lighting are independently metered item by item, which is scored 5 points.
2. Take measures to reduce building energy consumption, which is totally scored 6 points. The building energy consumption is 10% lower than that stipulated in the current relevant local energy saving standards of the building, which is scored 3 points; it is 20% lower, which is scored 6 points.
3. Utilize renewable energy reasonably based on national climate and natural resource conditions, which is scored and accumulated according to the following criteria, totally 12 points:

**1** Take measures to utilize renewable energy reasonably, which is scored 5 points;

**2** Utilize renewable energy to generate electricity, heat, etc., which is scored according to the percentage of renewable energy, totally 10 points.

Table 7.2.11 Scoring criteria for utilization of renewable energy

|  |  |  |
| --- | --- | --- |
| Utilization type of renewable energy | The percentage of renewable energy | Score  (points) |
| Use renewable energy system for electricity generation, heating, cooling, domestic hot water, etc. | 1％ | 2 |
| 5％ | 4 |
| 10％ | 6 |
| Use renewable energy directly | Without follow-up procedure | 0 |
| With follow-up procedure | 1 |

**Ⅲ Water Saving and Water Resource Utilization**

1. Use of 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% of 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.

1. 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 10 points:

**1** Adopt water saving equipment or technology for greening irrigation, which is according to the following criteria respectively:

1) Adopt a water-saving irrigation system, which is scored 3 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 5 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 5 points.

1. 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 9 points:

**1** For rainwater entering the outdoor waterscape, ecological facilities are used to reduce runoff pollution, which is scored 5 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.

1. Use non-traditional water sources, which is scored and accumulated respectively according to the following criteria, totally 16 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 4 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 2 points; it is not less than 50%, which is scored 4 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 2 points; it is not less than 40%, which is scored 4 points.

**4** Make grey water recovery and utilization plan, and take measures to treat and recycle grey water to ensure it meets the current standard, which is scored 4 points.

**Ⅳ Material Saving and Green Materials**

1. Use non-traditional water sources, which is scored and accumulated respectively according to the following criteria, totally 16 points:

**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.

1. The civil engineering and decoration engineering of all parts of the building are conducted as integrated design and construction, which is scored 8 points.
2. 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 rebar 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 Q355 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.

1. 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.

1. 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**

1. 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.
2. 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.
3. Signage system that is easy to identify and use shall be established both inside and outside the building.
4. The pollution sources with excessive discharge shall not exist in the site.
5. 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**

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 8 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 8 points;

**2** Take ecological compensation measures such as recovery and utilization of topsoil, which is scored 8 points;

**3** According to the actual situation of the site, take other ecological restoration or compensation measures, which is scored 8 points.

1. 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 8 points. Better than the current local relevant standards, which is scored 8 points. If there are no relevant local standards, the volume capture ratio of annual rainfall of the site reaches 55%, which is scored 4 points; it reaches 70%, which is scored 8 points.
2. Make full use of the space to set up green space, which is scored according to the following criteria, totally 10 points:

**1** Residential building is respectively scored and accumulated according to the following criteria:

1) The green space rate above of the planning index, which is scored 4 points;

1. 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 Ag (m2/person) | | Score (points) |
| New area construction | Old area renovation |
| 0.50 | 0.35 | 2 |
| 0.50<Ag<0.60 | 0.35<Ag<0.45 | 4 |
| Ag>0.60 | Ag>0.45 | 6 |

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

1) The green space rate of public buildings above of the planning index, which is scored 6 points;

2) Green space is open to the public, which is scored 4 points.

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

1. 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 over ground ecological facilities, which is scored 3 points;

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

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

1. Take measures to reduce the impact of air-conditioning emissions on global warming and the ozone layer, which is respectively scored and accumulated according to the following criteria, totally 7 points:

**1** Residential buildings that do not use air conditioners, or use natural refrigerants and new environmentally friendly air conditioner refrigerants, which is scored 7 points;

**2** Commercial buildings and other production occasions adopt indirect(secondary) refrigeration system with refrigerant, which is scored 7 points.

**Ⅱ Outdoor Physical Environment**

1. The ambient noise in the site is superior to the requirements stipulated in the relevant local standards for noise, which is scored according to the following criteria totally 10 points:

**1** The ambient noise value is greater than 60dB(A) at night and less than or equal to 70dB(A); and it is greater than 50dB(A) and less than or equal to 55dB(A) during the day, which is scored 5 points.

**2** The ambient noise value is less than or equal to 60dB(A) at night; and less than or equal to 50dB(A) during the day, which is scored 10 points.

1. 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 the relevant local standards, which is scored 5 points;

**2** Restrictions on light pollution of outdoor nightscape lighting is in accordance with the requirements stipulated in the relevant local standards, which is scored 5 points.

1. Wind environment in the site is conductive 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.

1. The outdoor thermal environment meets the needs of local human thermal safety and thermal comfort, which is scored 5 points.
2. Take measures to reduce the heat island intensity, which is respectively scored and accumulated according to the following criteria, totally 12 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 3 points;

**4** Make full use of passive cooling facilities such as natural water bodies or water features, or set up active cooling measures such as artificial atomization for cooling when it is hot, which is scored 3 points.

**9 Openness and Innovation**

**9.1 General Requirements**

1. In the assessment of green building, openness and innovation items shall be assessed according to the provisions of this chapter.
2. The score of openness 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**

1. Decoration materials selected for buildings, such as artificial board, wooden floors, ceramic tiles, waterproofing and sealing, and coatings, etc., certified to meet local green product evaluation standards. The number of varieties reaches 3, which is scored 5 points; the number of varieties reaches 4 or above, which is scored 10 points.
2. Encourage the use of building materials and products that provide life-cycle information and have a low environmental impact on the entire life-cycle of the building (including the embodied carbon generated), which is scored 10 points.
3. 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 scored10 points; it is applied in three stages, which is scored 15 points.
4. Construction and management is carried out by taking the following measures, which is respectively scored and accumulated according to the following criteria, totally 15 points:

**1** Take measures to reduce the loss of ready-mixed concrete and the loss rate is reduced to 1.0%, which is scored 5 points;

**2** Take measures to reduce the loss of on-site processed rebar, and the loss rate is reduced to 1.5%, which is scored 5 points;

**3** The cast-in-place concrete member adopts a template system of wall finishing free like aluminum mold, which is scored 5 points.

1. Take measures to reduce the pollution of water, soil and air caused by project construction, which is respectively scored and accumulated according to the following criteria, totally 15 points:

**1** Take control measures to prevent soil erosion at the construction site, which is scored 4 points;

**2** Adopt dust control measures during project construction to reduce or prevent dust from surface and air transmission, which is scored 4 points;

**3** Take control measures to prevent rainwater to be polluted by potential pollutant at the construction site (gasoline, oil, paint, solvent, cement, waste, etc.), which is scored 4 points;

**4** Carry out safety inspection and maintenance regularly on the construction site, which is scored 3 points.

1. Waterfront buildings should be designed for flood control to adapt to climate change, which is respectively scored and accumulated according to the following criteria, totally 20 points:

**1** Elevate buildings above the predicted flood level by piers, piles, columns or bearing walls, which is scored 4 points;

**2** Flood-proof the lower levels of buildings by sealing them against water penetration, which is scored 4 points;

**3** Employ wet flood-proofing methods, which is scored 4 points;

**4** Arrange all mechanical and electrical equipment in water-tight units or higher than the highest predicted flood level in the building, which is scored 4 points;

**5** Install water resistant and easy-to-clean materials for lower floors, which is scored 4 points.

1. Take measures to prevent sand and dust storms in the building in arid and semi-arid areas, which is respectively scored and accumulated according to the following criteria, totally 10 points:

**1** Plant plants suitable for growing in desert and arid areas, form a ground cover layer, improve ground cover environment, fix soil, reduce wind speed, increase air humidity and improve microclimate environment, which is scored 5 points;

**2** Restore forest and grass vegetation around the site, establish a biological protection system to prevent sandstorms, prevent the further expansion of land desertification, and reduce sand and dust sources as much as possible, which is scored 5 points.

1. Adopt architectural style design with appropriate regional characteristics and inherit regional architectural culture according to local conditions, which is scored 10 points.
2. 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 3points.

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

1. 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.

1. 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.