

ICS 29.140.99

CCS K 70



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 43992-2024

**Specification for construction service quality evaluation of
urban luminous environment**

城市光环境建设服务质量评价规范

Issued on: April 25, 2024

Implemented on: November 1, 2024

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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3 Terms and definitions

3.1 urban luminous environment: the collective name for the functional lighting and the landscape lighting at night of outdoor public spaces, buildings and structures and other scenery.

3.2 functional lighting: lighting that safeguards the movement of people and outdoor activity by artificial light. 3.3 landscape lighting: lighting that shapes the night landscape of the city by artificial light, including decorative lighting and lighting scenery.

3.4 lighting facilities: the lighting appliances, distribution installations, control systems, pipes and cables, lamp poles, working pits and other ancillary installations used for lighting.

3.5 lighting control system: a system made up of computers, display equipment, control software, a communication network and centralised controllers distributed at the lighting installations, which controls the luminaires remotely over a dedicated channel or over a public network with an encryption mechanism, and which has functions such as data acquisition, analysis and processing, monitoring, control, fault alarm, programme editing and system and task management.

4 General requirements

4.1 The construction service for the urban luminous environment is to include requirements on the process of the service and requirements on its results, or one of the two.

4.2 The quality evaluation is to aim at whole life cycle management and at raising the quality of the result, shaping an urban luminous environment that is safe, efficient, low in carbon and saving of energy.

4.3 to 4.4 The party organising the evaluation may include, but is not limited to, the industry management unit, the construction management unit and the funding unit; the evaluation may take the form of self-evaluation or of third-party evaluation.

4.5 Village and town lighting is to be carried out according to GB/T 40995 and evaluated according to this document.

5 Requirements for the construction service process

5.1 Project initiation. The management unit of the urban luminous environment may initiate a project, which is to satisfy the urban lighting plan or the examination of the urban luminous environment. The initiation stage is to identify the project management unit, the investment body and the source of funds, and should provide the initiation documents and feasibility study report required locally, which are to pass the corresponding examination, filing or approval. For projects in key areas or for key projects, the initiation requirements are to add a demonstration of the reasonableness, the necessity and the sustainability of the project. Experts or specialist bodies may be brought in at the initiation stage to support the decision by demonstration, research, consultation and testing.

5.2 Planning and design. The urban lighting plan is to be prepared according to CJJ/T 307 by a planning unit holding planning qualifications. The design scheme is to state the design positioning, to explain how it conforms to policy and to the plan, and to describe the measures controlling high energy consumption, light pollution and excessive lighting. The design content is to propose, for the expected effect and according to the different lighting methods, quantified indicators for illuminance or luminance, colour temperature and dynamic effects, together with product solutions able to reach those indicators. The design is to avoid affecting the daytime landscape and to provide a reasonable cost estimate with the basis on which it was prepared. Scheme approval is to strengthen planning and design

control and should use digital aids.

5.3 Procurement of installations. The purchasing unit is to set up a procurement management system defining responsibility for the procurement of installations and the management of materials, to determine the procurement management flow and the construction unit, to lay down management and control procedures and methods, and to establish a ledger mechanism for the procurement, acceptance, custody, marking, issue, recovery and disposal of non-conforming materials. It is to draw up a procurement plan matched to the design and construction progress, determining the purchase batch and the best time of supply; the plan is to be examined by the departments concerned and approved by an authorised person before it is carried out, and is to be changed as prescribed when necessary. Products are to be bought according to the parameters set by the design unit, preference being given to products holding Chinese energy conservation certification or green building material product certification, and the supplier is to submit evidence of its ability to perform, namely qualification documents, warranty documents, product specifications and certificates of conformity, together with third-party test reports on optical effect and on safety, as the basis for evaluating the suitability of the product. Before procurement the construction unit is to evaluate the luminaires on the basis of those third-party test reports and of the requirements set by the design unit. The supplying unit is to provide the materials required by the procurement contract, to cooperate with sample testing and to deliver on time. The construction unit is to organise a centralised lamp trial on site, and the design unit is to help confirm the effect and to seal samples of the luminaires that pass.

5.4 Site implementation. The implementation flow may be divided into a preparatory stage, an installation stage, a commissioning stage and a trial run stage. In the preparatory stage a project progress plan is prepared according to the contract, covering explanatory notes, the progress schedule, resource needs and progress safeguards; the installation works are re-measured against the actual site conditions, which includes discussion of the installation scheme, the preparation of special construction schemes, the drawing of detailed construction drawings, joint review by the disciplines and the making and verification of samples; a sample section trial is run to confirm the effect, the mounting structure and safety, and construction may begin only after the four parties, that is the construction, design, supervision and contracting units, have inspected and passed it; the main incoming equipment and materials are inspected and submitted for approval according to the goods entry flow, with the certificate of conformity, the third-party test report and the CCC certification for products in the compulsory scope or the CQC certification for products in the voluntary scope; and luminaires arriving in large batches are sampled, the proportion being increased and the sampling repeated for items that fail, with the replacement of products that do not meet the requirements. In the installation stage the work follows GB 50303, GB 50617, GB 50168 and CJJ 89, and the change process, change schemes and change results are recorded and kept as the whole-process management of the project

requires. In the commissioning stage the construction unit prepares a special commissioning scheme before commissioning so as to avoid light pollution; the circuits of the lighting distribution boxes, the marking of the luminaire circuits and the control of the supply and distribution are to agree with the design and the related indications are to work normally; and the dimmable LED luminaires are commissioned for dimming, colour change and dynamic variation by a combination of hardware and software, the result meeting the design. In the trial run stage the construction unit organises a single-machine trial run before the quality acceptance, and the construction unit organises, coordinates and directs the interlocked and load trial run and approves the trial run scheme; while the equipment is running there is to be no safety accident and the requirements for energised trial running of GB 50303, GB 50617, GB 50618 and CJJ 89 are to be met. Site implementation is to determine the policy and objectives of production safety management, to set up a system of responsibility for production safety in the project and to comply with GB 50656, JGJ/T 77, JGJ 59 and JGJ 146.

5.5 Closing out. Completion acceptance is organised by the construction unit with the design, construction and supervision units taking part; where the works are to be handed over to a receiving unit, the construction unit is to notify that unit to take part. Acceptance is to meet GB 50303, GB 50617, GB 50168 and CJJ 89; the quality acceptance of multifunction lamp poles and similar works is to meet the relevant national and industry standards; the control system and the equipment room are to comply with GB 50174 and CJJ/T 227, the intelligent integration system with GB 50339 and the information security safeguards with GB/T 22239. Once acceptance is passed the parties are to sign and seal the record together before the works are handed over for use, and for the intelligent control system and special equipment the construction unit is to write an operating manual and give the necessary training. After completion acceptance the construction unit is to submit the completion settlement report and the full settlement material as the contract provides, including the settlement statement, the contract documents, the as-built drawings, the site instructions and the measurement tables, and to cooperate with the settlement audit; the final account is settled at the price finally determined by the audit report of the examining department. The project enters the warranty period on the day it passes completion acceptance, the period being that agreed in the contract or, where the contract is silent, not shorter than the relevant national standard, and during it the construction unit is to perform its warranty duties and keep the installations running safely and normally. The collection, sorting, preparation, classification and filing of records by the construction unit are to comply with GB/T 50328; during implementation the construction unit is to collect the preparatory documents, supervision documents, construction documents, construction drawings and completion acceptance documents, and after acceptance is to file the records of the initiation, planning and design, procurement, site implementation and closing-out stages.