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Evaluation of the energy performance of lighting systems

照明系统能效评价

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Evaluation of the energy performance of lighting systems

1 Scope

This document specifies the evaluation grades and evaluation procedures for the energy performance of lighting systems.

This document applies to the evaluation of energy performance of lighting systems in stably operated urban roads, highway tunnels, public buildings, and outdoor work places. It can be used as a reference for the evaluation of energy performance of other lighting systems.

This document does not apply to the acceptance evaluation of lighting systems.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB 17625.1, Electromagnetic compatibility - Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase)

GB/T 17743, Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

GB 17896, Minimum allowable values of energy efficiency and energy efficiency grades of ballasts for tubular fluorescent lamps

GB/T 18595, Equipment for general lighting purposes - EMC immunity requirements

GB 19573, Limited values of energy efficiency and rating criteria for high-pressure sodium vapour lamps

GB 19574, Limited values of energy efficiency and evaluating values of energy conservation of ballast for high-pressure sodium lamps

GB 20053, Minimum allowable values of energy efficiency and energy efficiency grades for ballasts of metal-halide lamps

GB 20054, Minimum allowable values of energy efficiency and energy efficiency grades for metal-halide lamps

If the total score for the evaluation of energy performance of the lighting system is lower than 60, it is unqualified, and energy-saving measures shall be taken to optimize and improve it in time.

5 Evaluation procedure

5.1 Determine the evaluation scope

Before the evaluation, a list of lighting facilities involved in the evaluation shall be clearly defined, the evaluation scope shall be determined, and a written record shall be formed.

The evaluation scope shall be jointly determined by the lighting system operator or manager, the evaluation agency or personnel.

The scope of the lighting system usually includes lamps and a control management system. Among them, the lamps in the lighting system can be either integrated lamps or lamps composed of power supplies, light sources/modules, and the like. The control management system usually includes a single lamp controller, a sensor installed inside or outside the lamp, a centralized controller outside the lamp (also known as "cabinet control"), and control software.

5.2 Determine the evaluation period

The time period (evaluation period) involved in the evaluation shall be clearly defined before the evaluation. The time period during which the lighting system is operating normally shall be selected as the evaluation period.

5.3 Collect data

Before the evaluation, technical and management documents related to system design, selection, operation and management, etc. shall be collected according to the determined evaluation scope and evaluation period, including but not limited to:

a) basic system information;

b) system design information;

c) project bidding documents, energy-saving assessment and other special reports;

d) equipment ledger, including a list of equipment and facilities within the system boundary;

e) relevant test, evaluation and verification reports;

f) technical data such as operating procedures, operation records, maintenance records, energy consumption statistics, historical lighting time, etc.;

g) personnel qualification certificates, training records, etc.;

h) energy-saving renovation certification documents and others.

When the collected data cannot fully confirm the actual operation of the system, on-site measurement shall be carried out.

5.4 Evaluation implementation

5.4.1 The lighting system operator or manager shall ensure that the system operation meets the requirements of laws, regulations and mandatory standards on safety, energy saving and environmental protection.

5.4.2 The evaluation agency or personnel shall evaluate each index in accordance with the lighting system energy performance evaluation index system and scoring method given in Appendix A, from six aspects, including equipment and facilities, system design, energy-saving monitoring, operation control, energy-saving renovation, and management measures, and sum up the scores of each index to obtain the quantitative result of the comprehensive score for the evaluation of energy performance of the lighting system.

5.4.3 The evaluation agency or personnel shall give the score by consulting and checking design documents, statistical reports, original records, declaration documents, analysis/test reports, third-party certification certificates and other supporting materials. Relevant evaluation information can also be collected through discussions, field investigations, sample surveys, and field tests.

5.4.4 The evaluation agency or personnel can give suggestions on energy-saving measures in terms of system optimization and transformation, strengthening management, etc. based on the scoring results.

5.5 Prepare evaluation report

The evaluation report shall include the following:

a) a brief description of the evaluation work process;

b) evaluation implementation team;

c) evaluation scope;

d) a list of information collected for the evaluation;

e) a description of the score sheet and certification materials;

f) energy performance grades;

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