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

GB/T 44409.3-2026

**Heating, ventilation and air conditioning systems for rolling
stock - Part 3: Energy efficiency**

机车车辆空气调节系统 第3部分：能源效率

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 3 of GB/T 44409 "Air Conditioning Systems for Locomotives and Rolling Stock". GB/T 44409 has already published the following parts.

---Part 1: Terms and Definitions;

---Part 2: Comfort;

---Part 3: Energy Efficiency this document is modified to adopt ISO 19659-3:2022 "Heating, ventilation and air conditioning systems for railway applications - Locomotives and rolling stock - Part 3".

Part. Energy Efficiency.

This document has undergone the following structural adjustments compared to ISO 19659-3:2022.

---Tables 2 to 4 correspond to Table 2 of ISO 19659-3:2022;

---Removed ISO 19659-3:2022 version 3.2.

The technical differences between this document and ISO 19659-3:2022, and the reasons

therefor, are as follows.

---Abbreviations have been removed because they are not used in this document (see 3.2 of 19659-3.2022);

---ISO 19659-1 has been replaced with the normatively referenced GB/T 44409.1 to adapt to my country's technical conditions (see Chapter 3);

The phrase "The customer requests this mode; detailed requirements should be specified in the technical specifications" has been removed because, in addition to the technical specifications, the customer can also...

Instead of specifying a concrete method, it is advisable to use alternative means, such as contractual clauses, to make such requests. It is better to specify it as an optional option rather than a clearly defined method.

(See 4.4 and 4.5);

---The normative reference GB/T 44409.2 has been added to adapt to my country's technical conditions (see 4.6, 5.1, 5.3.3.4 and 5.3.3.5);

---It is clarified that the operating time period and operating duration should be selected from Table 1 to adapt to my country's technical conditions (see 4.6);

---ISO 19659-2 has been replaced with the normatively referenced GB/T 44409.2 to adapt to my country's technical conditions (see 5.2.1, 5.2.2,...).

(5.3.2, 6.3.1, 6.3.2 and 6.4)

---Passenger capacity has been changed and content for non-China regions has been removed to adapt to my country's technical requirements (see 5.3.2);

---The following has been removed from section 5.3.3.2."The annual runtime in 5.3.3.4 can be obtained by averaging the annual runtime of various locations," and section 5.3.3.5...

The average weighting coefficient can be calculated based on the average annual running time. If it is necessary to obtain the annual energy consumption of the train under various operating modes, the technical specifications should clearly specify the operating schedule and runtime of the pre-adjustment mode and parking mode, because the annual operating time...

The values for length, weighting coefficients, etc., have been given in Appendix A or Appendix B (see 5.3.3.2);

---The annual runtime and weighting coefficient, previously specified in the technical specifications, will now be selected from Appendix A or Appendix B to better suit my country's technical requirements.

Surgical conditions (see 5.3.3.4 and 5.3.3.5);

---The power data sources for air conditioning systems have been expanded to include experimental testing methods to adapt to my country's technical conditions (see 6.1);

---It was clarified that the simulation would be conducted on a thermally stable train to adapt to my country's technological conditions (see 6.2.1);

---It is clarified that if a train does not operate under a certain mode, its corresponding annual total energy consumption, annual total heat load, and average power are all zero.

Adapt to my country's technological conditions (see 6.2.2.1, 6.2.3.1, 6.2.4);

---Change "The method for post-processing test data shall be negotiated by both parties to the contract" to "Test data shall be post-processed" to adapt to my country's technological requirements.

Conditions (see 6.3.2);

---The prerequisite for post-processing modification is "the deviation does not comply with the provisions of GB/T 44409.2" to adapt to my country's technical conditions (see 6.4).

The following editorial changes have been made to this document.

---To harmonize with existing standards, the standard name has been changed to "Air Conditioning Systems for Locomotives and Rolling Stock - Part 3: Energy Efficiency";

---Descriptive content has been removed (see 5.1, 5.3.1, 5.3.2, and 6.4 of ISO 19659-3:2022);

---The note in ISO 19659-3:2022 stating that 6.3.2 is not applicable to the situation in my country has been deleted;

---The content in Annex A of ISO 19659-3:2022 that was not applicable to the situation in my country has been deleted;

---The case study on meteorological data analysis in Annex B of ISO 19659-3:2022 has been removed. The data is now based on statistical data from actual meteorological conditions in my country.

The analysis lists the annual runtime and weighting coefficient values for different climate regions and selected cities (see Appendix A and Appendix B).

---References have been removed.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed and is under the jurisdiction of the National Railway Administration.

Introduction

The International Organization for Standardization's Technical Committee on Railway Applications (ISO/TC269) developed standards for air conditioning in rail transit vehicles, including...

This document comprehensively defines the terminology and definitions, comfort parameters, and energy efficiency of air conditioning systems for locomotives and rolling stock, covering topics such as terminology and definitions, thermal comfort, and energy efficiency.

Source efficiency and testing methods, etc. To formulate standards for air conditioning systems of rail transit locomotives and rolling stock that conform to my country's national conditions, and to improve the relevant standard system, [further details are needed].

To align with international standards for air conditioning technology in rail transit locomotives and rolling stock, and based on domestic application practices and relevant international standards, GB/T 44409 was formulated.

"Air Conditioning System for Locomotives and Rolling Stock". GB/T 44409 is proposed to consist of the following parts.

---Part 1: Terms and Definitions. The purpose is to systematically and comprehensively define the terms, definitions, symbols, and usage of air conditioning systems in locomotives and rolling stock.

Abbreviations.

---Part 2: Comfort. The purpose is to specify the thermal comfort parameters and equipment performance requirements for the air conditioning systems of locomotives and rolling stock. and experimental methods.

---Part 3: Energy Efficiency. The purpose is to specify methods for measuring, testing, and evaluating the energy efficiency of air conditioning systems in locomotives and rolling stock.

Locomotive and rolling stock air conditioning system Part 3: Energy Efficiency

1 Scope

This document specifies the basic rules for calculating the energy efficiency of locomotives and rolling stock train modes and air conditioning systems, and describes the evaluation methods.

This document applies to the energy efficiency calculation and experimental verification of air conditioning systems in passenger compartments, private rooms, and some auxiliary spaces of locomotives and rolling stock, and to the driver.