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

GB/T 5111-2024

**Acoustics - Measurement of noise emitted by rail bound
vehicles**

声学 轨道机车车辆发射噪声测量

(English Translation)

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting:

This document replaces GB/T 5111-2011 "Acoustic Measurement of Noise Emitted by Railway Vehicles":

In addition to structural adjustments and editorial changes, the main technical changes are

as follows:

- Changed the scope of application (see Chapter 1, Chapter 1 of the:2011 edition);
- Added the terms "vehicle", "rail acoustic roughness spectrum", "track attenuation rate", "test section", "reference track section", "AF weighting", "Time history of sound pressure level", "intermittent sound", "track acoustic characteristics" (see 3.2, 3:8, 3:9, 3:10, 3:11, 3:15, 3:22 and 3:24);
- Deleted the terms "single event sound level" and "through exposure sound level" (see 3.13 and 3:14 of the:2011 edition);
- Changed the additional measurement position of the fixed test (see 5.5, Appendix A of the:2011 edition);
- Changed the track status and vehicle conditions of the uniform speed test (see 6.2, 6:3, 6:5, 6:4 of the:2011 edition);
- Changed the limit value of rail acoustic roughness level (see 6.2:5, Appendix B of the:2011 edition);
- Added requirements for noise measurement when conducting environmental impact assessment or dynamic project acceptance (see 6.8);
- Changed the accelerated test evaluation method (see 7.5, 7:6, 7:3 of the:2011 edition);
- Added a chapter on "Measurement Quality" (see Chapter 9);
- Changed the content of the measurement report (see Chapter 10, Chapter 8 of the:2011 edition);
- Added the characterization method of noise pulse characteristics (see Appendix B);
- Changed the assessment method of small deviation tolerance of rail acoustic roughness (see Appendix D, Appendix C of the:2011 edition);
- Added uniform speed test --- special case (see Appendix F);
- Added the measurement and data processing methods of the fluctuation degree AR of the noise emitted by railway locomotives and vehicles (see Appendix G):

This document is modified to adopt ISO 3095:2013 "Acoustics - Railway applications - Measurement of noise emitted by rolling stock":

This document has the following structural adjustments compared to ISO 3095:2013:

- Added 3:4, 3:7, 3:14, 3:18, 3:19, 3:20 and 3:24, 3:5, 3:6 corresponding to 3:4, 3:5, 3:8 in ISO 3095:2013~ 3:13 corresponds to 3:6~3:11 in ISO 3095:2013, 3:15~3:17 corresponds to 3:12~3:14 in ISO 3095:2013, 3:21~3:23 correspond to 3:15~3:17 in ISO 3095:2013;
- Deleted 6:1:1~6:1:3 and 6:3:4 in ISO 3095:2013;

---Added 6:8;

--- Deleted 7:2:1~7:2:3, 8:1:1~8:1:3 in ISO 3095:2013;

--- Changed the order of the appendices: Appendix A corresponds to Appendix D in ISO 3095:2013, and Appendix B corresponds to Appendix A, Appendix C corresponds to Appendix E in ISO 3095:2013, Appendix D corresponds to Appendix C in ISO 3095:2013, Appendix E corresponds to Annex F in ISO 3095:2013, Annex F corresponds to Annex B in ISO 3095:2013, and Annex H corresponds to Annex G in ISO 3095:2013;

--- Added A:4:1, A:4:2~A:4:3 corresponding to D:4:1~D:4:2 in ISO 3095:2013;

--- Added Appendix G;

--- Added H:7:

The technical differences between this document and ISO 3095:2013 and their reasons are as follows:

--- The scope of application has been changed (see Chapter 1), mainly taking into full consideration the limits of noise emission from railway locomotives and rolling stock in my country, environmental impact assessment the references of this document in the industry technical specifications such as noise source intensity measurement, environmental noise measurement and dynamic project acceptance are further reviewed:

Step 1: Clarify the scope of use of this document;

--- Added terms and "supervision inspection", "rail acoustic roughness level", "A-weighted sound pressure level", "recording period", "train passing period" "Equivalent continuous A-weighted sound pressure level during the passing period" "Track acoustic characteristics" (see 3.4, 3:7, 3:14, 3:18, 3:19, 3:20 and 3:24) to meet the actual usage in my country;

--- Deleted the instrument verification time requirements for type assessment tests and the corresponding normative reference IEC 61672-2:2003, Conform to the actual situation in my country;

--- Changed the requirements for 1/3 octave filters, instrument performance classification, sound calibrator implementation standards and measurement reports:

GB/T 3241 replaces IEC 61260:1995 and IEC 61260:1995/Amd:1:2001, GB/T 3785.1 replaces IEC 61672-1:2002, GB/T 15173 replaced IEC 60942:2003, GB/T 27025 replaced ISO/IEC 17025:2005 (see 4.1, 4:2 and Chapter 10) to meet the actual situation in my country;

--- Changed the acoustic environment requirements (see 5.2:1) to meet the characteristics of my country's railway and urban rail transit lines and actual noise measurement condition;

--- Changed the vehicle conditions (see 5.4:2, 6:3:2, 7:4:1 and 8:3) and track condition

requirements (see 5.3, 6:2, 7:3 and 8:2) to meet Actual engineering conditions in my country;

--- Changed the measurement environment conditions of the uniform speed test, acceleration test and braking test (see 6.1, 7:2, 8:1) and the fixed test environment conditions to meet the requirements of environmental conditions for measuring noise emitted by railways and urban rail transit in my country;

--- Changed the requirements for acoustic roughness and track attenuation characteristics of my country's rails, and adjusted EN15461:2011 and EN15610:2009 it is compiled into a reference document (see 6.2) to meet the acoustic characteristics of my country's tracks;

--- Changed the line condition requirements (see 6.2:2, 6:2:3) to meet the actual curve radius and speed of my country's railway and urban rail transit:

actual situation;

--- The limit of rail acoustic roughness level (see 6.2:5) has been changed to meet the requirements of rail acoustic roughness level for railway and urban rail transit in my country:

Research results and noise frequency characteristics;

--- Deleted the train formation (adjacent vehicles) in ISO 3095:2013 to meet the actual situation of railway and urban rail transit vehicles in my country:

Measurement requirements;

---Added other requirements for uniform speed test (see 6.8) to meet the application requirements of environmental impact assessment or dynamic engineering acceptance in my country;

--- Added the measurement and data processing method of the fluctuation degree AR of the noise emitted by railway locomotives and vehicles (see Appendix G) to meet the requirements of my country Need for assessment of track acoustic properties:

The following editorial changes were made to this document:

--- In order to coordinate with the existing standards, the name of the standard is changed to "Measurement of Noise Emitted by Acoustic Railway Locomotives and Vehicles";

--- Added uncertainty calculation examples;

--- Added informative references to GB/T 3240 and TB10761;

--- Changed the reference standard for uncertainty evaluation of measurement results, replacing ISO/IEC Guide 98 with GB/T 27418-3:2008: