

ICS 17.160
CCS J 04



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

GB/T 7031-2025

Replacing GB/T 7031-2005

**Mechanical vibration - Road surface profiles - Reporting of
measured data**

机械振动 道路路面谱 测量数据的报告

(English Translation)

Issued on: August 1, 2025

Implemented on: February 1, 2026

**Issued by: State Administration for Market Regulation, Standardization
Administration of China**

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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 7031-2005 "Mechanical Vibration Road Pavement Spectrum Measurement Data Report" and is consistent with GB/T 7031-2005.

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

--- Deleted the symbols "s" and " λ " and related information in Table 1 (see Table 1 of GB/T 7031-2005);

--- Change the symbol " y_2 " in Table 1 to " γ_2 " (see Table 1, Table 1 of GB/T 7031-2005);

--- Added the symbol " σ_2 " and related information in Table 1 (see Table 1);

- Added "INT is integer function" (see 5.1.2);
- Change "IEC 1260" to "IEC 61260-1" (see 5.3.4.2.1, 5.3.3.2.1 of GB/T 7031-2005);
- Added "(for example, see ISO 22476-1, ISO 22476-3)" (see 5.3.5.3.2);
- Change "wherein, photos omitted" to "wherein, measurement system description and photos omitted" (see A.1, GB/T 7031-2005 Appendix A);
- Added the notes to Table B.1 (see B.2);
- Added the text content in C.1. "Assume that the exponent of the fitted PSD is $w = 2$, so that the velocity PSD is constant" (see C.1);
- Deleted the symbol " λ " and related information in Table C.1 (see Table C.1 of GB/T 7031-2005);
- Added the symbol "L" and related information in Table D.1 (see Table D.1);
- Change "L" in the text of paragraph 2 of D.6.1 to "block size L" (record length) (see D.6.1, GB/T 7031-2005 D.6.1);
- Change "Figure D.2 shows the relationship between the regularized standard error, frequency resolution, block length and total signal length" to "Figure D.2 shows the relationship between the normalized standard error (random error), skewness error and frequency resolution" (see D.7.2, D.7.2 of GB/T 7031-2005).

This document is equivalent to ISO 8608:2016 "Reporting of mechanical vibration spectrum measurement data for road pavement surfaces".

The following minimal editorial changes have been made to this document.

- Added the titles "5.1.1.1 General", "5.1.1.4 Relationship between the two reporting formats", "5.3.1 General", and "A.1 General".

"B.1 General", "C.1 General", "C.6.1 General", "D.6.2.1 General";

- The general characteristics and octave characteristics of Figures A.3 and A.5 are given in Table A.1, and the road descriptions in Figures A.2 to A.5 are given in Table A.1.

Note given in;

- Adjust the description content in Figure A.2, Figure A.3, Figure A.4, Figure A.5, Figure C.1, Figure C.2, Figure D.1 and Figure D.2 to index symbols illustrate;

- The structures of Table B.2, Table C.2, Table C.3 and Table C.4 have been adjusted, and the sub-tables have been merged into one table.

Introduction

The purpose of this document is to facilitate the compilation and comparison of vertical road profile measurement data of various road surfaces.

The method is applicable to single wheel track or multi-wheel track road spectrum measurement.

This document specifies how to prepare a measurement report rather than how to perform the measurement. The measuring instrument may affect the measurement results and should be the report describes the characteristics of the measurement system.

Appendix A. provides an example of a report that meets the minimum requirements of this document.

Appendix B. In order to conveniently classify the road spectrum according to the conventional classification, the approximate classification method of typical roads is given, and the conventional road

Classification, a curve fitting method for characterizing spectral data is proposed.

Appendix C provides general guidelines for describing road profiles using statistical parameters.

Proposed research or other related research, such as vehicle comfort, suspension, and road spectrum evaluation.

Appendix D. Discusses the use of Fast Fourier Transform (FFT) techniques to process Power Spectral Density (PSD), and also discusses statistical accuracy.

question.

Report on Mechanical Vibration Road Pavement Spectrum Measurement Data

1 Scope

This document specifies a unified method for reporting vertical track profile data, applicable to single or multiple wheel track track profile measurements.

This document is applicable to vertical road spectrum data measurement reports for highways, streets, expressways and off-road roads, and is not applicable to railways.

Includes equipment and methods for measurement and data processing.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

IEC 61260-1 Electroacoustics - Octave-band filters - Part 1: Specifications and fractional-octave-band filters - Part 1: Specifications) Note. GB/T 3241-2010 Electroacoustics Octave and fractional octave filters (IEC 61260:1995, MOD)

3 Terms and Definitions

For the purposes of this document, the terms and definitions defined in ISO 2041 and the following apply.

spatial frequency

The reciprocal of the wavelength.

Note: Spatial frequency is expressed as the number of waves per metre (m⁻¹).

The finite mean square value of a signal within a unit frequency range.

Note: For a unilateral spectrum, the integral value of the power spectrum density function in the XY linear coordinates should be equal to the variance (σ^2) of the original signal within its frequency distribution range.

If only the spectrum within the frequency range of 0~infinity is counted, the spectrum value will be multiplied by 2 due to the symmetry of the spectrum.

displacementPSD displacementPSD Power spectral density of vertical displacement of the pavement.

velocity PSD velocityPSD the power spectral density of the rate of change of the vertical displacement of the road surface (the slope of the vertical displacement of the road surface) within a unit distance.

accelerationPSD

The power spectral density of the rate of change of the vertical displacement slope of the road surface within a unit distance.

fading

Eliminate the effects of measurement system transfer function on PSD.