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Title: Draft BS ISO 13332 Reciprocating internal combustion engines - Test code for the measurement of structure-borne noise emitted from high-speed and medium-speed reciprocating internal combustion engines measured at the engine feet.

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 13332

Reciprocating internal combustion engines — Test code for the measurement of structure-borne noise emitted from high-speed and medium-speed reciprocating internal combustion engines measured at the engine feet

Moteurs alternatifs à combustion interne — Code d'essai pour le mesurage du bruit solidien émis par les moteurs alternatifs à combustion interne à vitesse élevée et à vitesse moyenne, mesuré aux pieds du moteur

ICS: 17.140.20; 27.020

ISO/TC 70

Secretariat: **SAC**

Voting begins on:
2025-01-03

Voting terminates on:
2025-03-28

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 70 internal combustion engines.

This second edition cancels and replaces the first edition (ISO 13332:2000), which has been technically revised.

The main changes are as follows:

- Terms and definitions such as speed level, angular speed level, time average speed level, time average angular speed level, and measurement time interval have been added. (see [3](#))
- "Symbols" in Chapter 4 of the original standard has been deleted. The requirements for "measuring environment" has been added. (see [4](#))
- "Technical Background" in Chapter 5 of the original standard has been deleted. The provisions for "measuring instruments" has been added. (see [5](#))
- The content related to the installation and operating conditions of the measured object has been adjusted to Chapter 6 of the new standard. (see [6](#))
- The content related to "acceleration measurement" has been adjusted to Chapter 7 of the new standard. The requirements of measurement uncertainty has been supplemented. The measurements of angular velocity and angular acceleration will be added. (see [7](#))
- The "calculation" has been added. (see [8](#))
- Add provisions on "record content". (see [9](#))
- The requirements related to "reporting" has been added. (see [10](#))
- The requirements related to "connections between engine and test environment" has been added. (see [Annex A](#))
- The contents of "sensor contact plane height correction" has been added. (see [Annex B](#))

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- The relevant content of "Frequency range" in original standard Chapter 7 has been adjusted to Appendix. (see [Annex C](#))
- "Engine-Structure-borne Noise Characterization- Test Report Form" has been adjusted to [Appendix D](#) and modified. (see [Annex D](#))

A list of all parts in the ISO ##### series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Noise in buildings, structures, ships, aircraft and land vehicles often arises from the use of internal combustion engines, particularly reciprocating engines, and there may be situations where these are the dominant noise source. Even where it is not dominant, it may form an unwelcome background noise. These noises, arising within the building, etc., can be transmitted in at least two ways as given below.

- a) Directly into the surrounding air. This is called airborne sound and ISO 6798 specifies methods for determining the airborne noise output of internal combustion engines.
- b) Through excitation or vibration in the supporting structure, pipes and shafts. These vibrations then pass through the structure as structural vibration, exciting in turn the walls and panels of the structure, resulting in the radiation of so-called secondary sound or structure-borne noise.

The ability of the source of vibration (the engine) to generate vibration in the structure in which it is mounted depends on the amount of motion of the engine at its mounting points, the properties of the engine mounting system and the mobility of the receiving structure. Vibration from the engine feet may be in the vertical sense, which is the one most easily visualised, but may also be longitudinal or transverse with respect to the crankshaft axis. The vibration source may also cause rotational input, resolved about each of the three orthogonal axes.

The passage through the structure of any vibration which has been caused in it can be very difficult to control, particularly at low frequencies. There are many possible modes of vibration of the structure which could be responsible for the transmission (compression, torsional or flexural modes). Only breaks in the continuity of the structure are likely to be completely effective, and this is not usually possible. Damping of the structure may be effective for some propagation modes, particularly at high frequencies/short wavelengths, but will not be sufficiently effective at low frequencies.

In spite of the difficulties in controlling the propagation of vibration within the structure, there are obvious benefits in knowing the characteristics of the engine as a potential vibration source so that a choice may be made amongst various competing mounting engines, or the structure and engine mounts can be designed to comply with the properties of the engine selected.

Reciprocating internal combustion engines — Test code for the measurement of structure-borne noise emitted from high-speed and medium-speed reciprocating internal combustion engines measured at the engine feet

1 Scope

This International Standard defines the procedure for measuring the capacity of a high-speed or medium-speed engine to generate vibration and the determination of the frequency limits of validity of the information quoted. The method described in this International Standard is not suitable for low-speed engines. This International Standard describes an engineering and not a precision method. Whether the tests are carried out on the test bed or on site shall be agreed between the user and the manufacturer.

This International Standard applies to high-speed and medium-speed reciprocating internal combustion engines for land, rail traction and marine use, excluding engines used to propel agricultural tractors, road vehicles and aircraft. This International Standard may be applied to engines used to propel road-construction and earth-moving machines, industrial trucks and for other applications where no suitable International Standard for these engines exists.

2 Normative references

The following normative documents include content that, when normatively referenced within this text, constitutes essential provisions of this International Standard. In the case of dated references, only the edition of the normative document referred to in this International Standard is applicable. For undated references, the most recent edition of the normative document referred to is applicable, including all amendments.

ISO 6798-1, *Reciprocating internal combustion engines — Measurement of sound power level using sound pressure — Part 1: Engineering method*

ISO 1503, *Spatial orientation and direction of movement — Ergonomic requirements*

ISO 2954, *Mechanical vibration of rotating and reciprocating machinery — Requirements for instruments for measuring vibration severity*

ISO 3046-1¹⁾, *Reciprocating internal combustion engines — Performance — Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods — Additional requirements for engines for general use*

ISO 3046-3, *Reciprocating internal combustion engines — Performance — Part 3: Test measurements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 3046-1, ISO 2954, and ISO 1503 are applicable, along with the following.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

1) To be published. (Revision of ISO 3046-1:2002)