

BS ISO 9533:2010



BSI Standards Publication

Earth-moving machinery — Machine-mounted audible travel alarms and forward horns — Test methods and performance criteria

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National foreword

This British Standard is the UK implementation of ISO 9533:2010. It supersedes BS 6912-3:1990 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/513/1, Earth moving machinery (International).

A list of organizations represented on this committee can be obtained on request to its secretary.

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Earth-moving machinery — Machine-mounted audible travel alarms and forward horns — Test methods and performance criteria

Engins de terrassement — Avertisseurs sonores de déplacement et de recul montés sur engins — Méthodes d'essai et critères de performance



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 9533 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 2, *Safety, ergonomics and general requirements*.

This second edition cancels and replaces the first edition (ISO 9533:1989), which has been technically revised. Notably, test methods and criteria have been modified to include the evaluation of self-adjusting sound level alarms and travel warning alarms.

Earth-moving machinery — Machine-mounted audible travel alarms and forward horns — Test methods and performance criteria

1 Scope

This International Standard specifies a static method for determining the sound output performance and alarm activation requirements of audible travel alarms and forward horns mounted on earth-moving machinery, as defined in ISO 6165, for operation on work sites and travelling on public roads. It offers objective test methodologies and performance criteria.

It is applicable only to those alarms and horns that are installed on the earth-moving machinery. It does not specify the installation of one or more audible travel alarms or forward horns on particular machines. It addresses neither the laboratory testing of warning alarm functionality nor durability.

NOTE Earth-moving machine manufacturer's practices, worksite requirements and local, national or regional regulations could require the fitting of the alarms or horns specified in this International Standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3411, *Earth-moving machinery — Physical dimensions of operators and minimum operator space envelope*

ISO 6165, *Earth-moving machinery — Basic types — Identification and terms and definitions*

ISO 6746-1, *Earth-moving machinery — Definitions of dimensions and codes — Part 1: Base machine*

IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

machine reference box

MRB

imaginary rectangular box that would just fit over the base machine according to ISO 6746-1, which excludes all equipment and attachment items such as buckets, dozers, backhoes, rippers and booms

3.2

audible travel alarm

machine-mounted audible alarm intended to warn or alert personnel of the potential hazard of the machine travelling under its own power

3.2.1

travel warning alarm

audible signal intended to warn or alert personnel, especially those near a machine, that the machine has been activated to travel under its own power

NOTE These alarms are normally associated with machines that have rotating upper structures.

3.2.2

reverse warning alarm

audible signal intended to warn personnel, especially those near the rear of a machine, that the machine has been activated to travel in a rearward direction under its own power

3.3

forward horn

audible signal activated by the operator of the machine intended to alert personnel near a machine, but especially near the front of the machine

NOTE A forward horn or horns can also be used as part of a theft or security alarm system for the machine.

3.4

fixed sound level alarm

audible travel alarm that produces a sound level independent of ambient sound levels

3.5

self-adjusting sound level alarm

audible travel alarm that automatically adjusts its sound level, throughout a defined range, in order to maintain a sound level differential between the output of the alarm and the ambient sound level measured by the alarm

3.6

ambient sound

all sounds in the test area not produced by the audible travel alarm(s)

3.7

free field

space with no reflecting surface within 30 m of the sound source or microphone in any direction except for the horizontal reflecting plane on which the test machine is located

4 Apparatus

4.1 Sound level meter with an extension cable or equivalent sound measurement system that meets the performance requirements of IEC 61672-1, Type 1.

It is recommended that for the purposes of this International Standard all sound pressure level measurements be rounded to the nearest whole number in decibels.

4.2 Acoustical calibrator, or equivalent measurement system, recommended to be used each day of measurement to calibrate the sound level meter prior to testing and for checking sensitivity drift after test completion. The effects of atmospheric pressure, temperature and use of a windscreen should be accounted for within the system calibration as recommended by the manufacturer of the instrumentation.

4.3 Microphone wind screen, designed for sound measurement and recommended by the manufacturer of the sound level meter or equivalent sound measuring system, which shall be used to maintain consistency from test to test and add protection to the microphone assembly.

4.4 Anemometer, or other device, for measuring ambient wind speed and direction, accurate to within $\pm 10\%$ at the highest recommended wind speed.