भारतीय मानक

Indian Standard

IS 12180 (Part 2) : 2024
ISO 7216 : 2015

कृषि एवं वानिकी के लिए ट्रैक्टर — ध्वनि मापन — परीक्षण पद्धति

भाग 2 गतिशील अवस्था में उत्सर्जित ध्वनि

(दूसरा पुनरीक्षण)

Tractors for Agriculture and Forestry — Noise Measurement — Method of Test

Part 2 Noise Emitted When in Motion

(Second Revision)

ICS 17.140.20; 65.060.01

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Agricultural Machinery and Equipment Sectional Committee, FAD 11

NATIONAL FOREWORD

This Indian Standard (Part 2) (Second Revision) which is identical to ISO 7216 : 2015 'Agricultural and forestry tractors — Measurement of noise emitted when in motion' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Agricultural Machinery and Equipment Sectional Committee and approval of the Food and Agriculture Division Council.

The Indian Standard (IS 12180) was first published in 1987 with the title 'Method for noise measurement of agricultural tractors' and was based on ISO 5131 : 1982 and ISO/DIS 7216. In the first revision in 2000, the standard was split into two parts with the general title 'Tractors and machinery for agriculture and forestry — Noise measurement — Method of test'. Part 1 was an identical adoption of ISO 5131 : 1996 covering method for the measurement of noise at the position of the operator(s) of a tractor or machine used in agriculture and forestry and Part 2 was an identical adoption of ISO 7216 : 1992 covering method for the measurement of noise emitted by wheeled tractors or self-propelled machine used in agriculture and forestry while in motion.

The second revision of the standard (Part 2) has been undertaken to align with the latest version of ISO 7216 published in 2015.

The text of ISO standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'; and

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to the following International Standards for which Indian Standards also exist. The corresponding Indian Standards, which is to be substituted in their respective place is listed below along with its degree of equivalence for the edition indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
IEC 60942 Electroacoustics — Sound calibrators	IS 15059 : 2023/IEC 60942 : 2017 Electroacoustics — Sound calibrators (*second revision*)	Identical
IEC 61672-1 Electroacoustics — Sound level meters — Part 1: Specifications	IS 15575 (Part 1) : 2016/IEC 61672-1 : 2013 Electroacoustics — Sound level meters: Part 1 Specifications (*first revision*)	Identical

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Introduction

Technical harmonization with OECD is ensured by the Maintenance Agency operating as specified in Annex A.

Indian Standard

TRACTORS FOR AGRICULTURE AND FORESTRY — NOISE MEASUREMENT — METHOD OF TEST

PART 2 NOISE EMITTED WHEN IN MOTION

1 Scope

This International Standard specifies a method for measuring the A-weighted sound pressure level of the noise emitted by agricultural and forestry tractors while the vehicle is in motion.

The conditions specified for the operation of the agricultural and forestry tractors during the measurements are defined to provide a realistic and repeatable assessment of the maximum noise emitted when it is in motion.

This International Standard is applicable to agricultural and forestry tractors, fitted with elastic tyres or rubber tracks.

It is not applicable to special forestry machinery, for example, forwarders, skidders, etc., as defined in ISO 6814 and agricultural and forestry tractors, fitted with steel tracks.

NOTE The test method calls for an acoustical environment which can only be obtained in an extensive open space.

2 Normative references

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

IEC 61672-1, *Electroacoustics — Sound level meters*

IEC 60942, *Electroacoustics — Sound calibrators*

ISO 6814:2009, *Machinery for forestry — Mobile and self-propelled machinery — Terms, definitions and classification*

3 Terms and definitions

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

3.1
agricultural tractor
self-propelled agricultural vehicle having at least two axles and wheels, or endless tracks, particularly designed to pull agricultural trailers and pull, push, carry and operate implements used for agricultural work (including forestry work), which may be provided with a detachable loading platform

Note 1 to entry: The agricultural vehicle has a maximum design speed of not less than 6 km/h and may be equipped with one or more seats.

[SOURCE: ISO 12934:2013, 3.1]

3.2
unballasted tractor mass
mass in the tractor in working order with tanks and radiators full, roll-over protective structure with cladding, and any track equipment or additional front-wheel drive components required for normal use

Note 1 to entry: Not included are the operator, optional ballast weights, additional wheel equipment, special equipment and loads.

[SOURCE: ISO 5700:2013, 3.2]

4 Measurement units and tolerances

The following units and tolerances apply to the maximum value measured:

—	rotational frequency (r/min)	± 0,5 % ;
—	time (s)	± 0,2 s ;
—	distance (m or mm)	± 0,5 % ;
—	force (N)	± 1,0 % ;
—	mass (kg)	± 0,5 % ;
—	atmospheric pressure (kPa)	± 0,2 kPa ;
—	tyre pressure (Pa)	± 5 % .

5 Instrumentation

5.1 A precision quality sound level meter shall be used meeting or exceeding the requirements of IEC 61672-1 for a class 1 instrument. If alternative measuring equipment is used, the tolerances shall not exceed those given in the relevant clauses of IEC 61672-1 for a class 1 instrument. Measurement shall be carried out with a frequency weighting network in conformity with curve A and set to give fast response as is described in the IEC publication.

5.2 The calibration of the equipment at the time of measurement shall be in accordance in all respects with the specifications of IEC 61672-1 for a class 1 instrument. Checking of the calibration shall be carried out at appropriate intervals and at least before and after each measurement session, using an acoustical calibrator in accordance with the specifications of IEC 60942 for a class 1 instrument. The calibrator shall be checked annually to verify its output and its calibration shall be traceable to a national standards laboratory.

6 Circumstances for testing

6.1 Acoustical environment

6.1.1 Measurements shall be made in a sufficiently silent, flat, and open zone. This area shall be an open space of 50 m radius, of which the central part of at least 20 m radius shall be practically level and made concrete, asphalt, or similar material and shall not be covered with powdery snow, high grass, friable soil or cinders.

6.1.2 The surface of the test track shall be of such a kind that pneumatic tyres or rubber tracks do not cause excessive noise. The surface shall be as clean and dry as possible (e.g. free of gravel, leaves, snow, etc.).

6.2 Ambient conditions

6.2.1 Measurements shall be made in fine weather with little or no wind. The level of background noise and the level of wind noise at the microphone location shall be at least 10 dB(A) below the noise level measured during the test. Any extraneous noise occurring during the reading, which is not connected to general sound level measurement, shall not be taken into consideration.

6.2.2 No correction shall be made to the test results for the atmospheric conditions or other factors. Atmospheric pressure shall not be less than 96,6 kPa. If this is not possible because of conditions of altitude, a modified injection pump setting may have to be used, details of which will be included in the report.

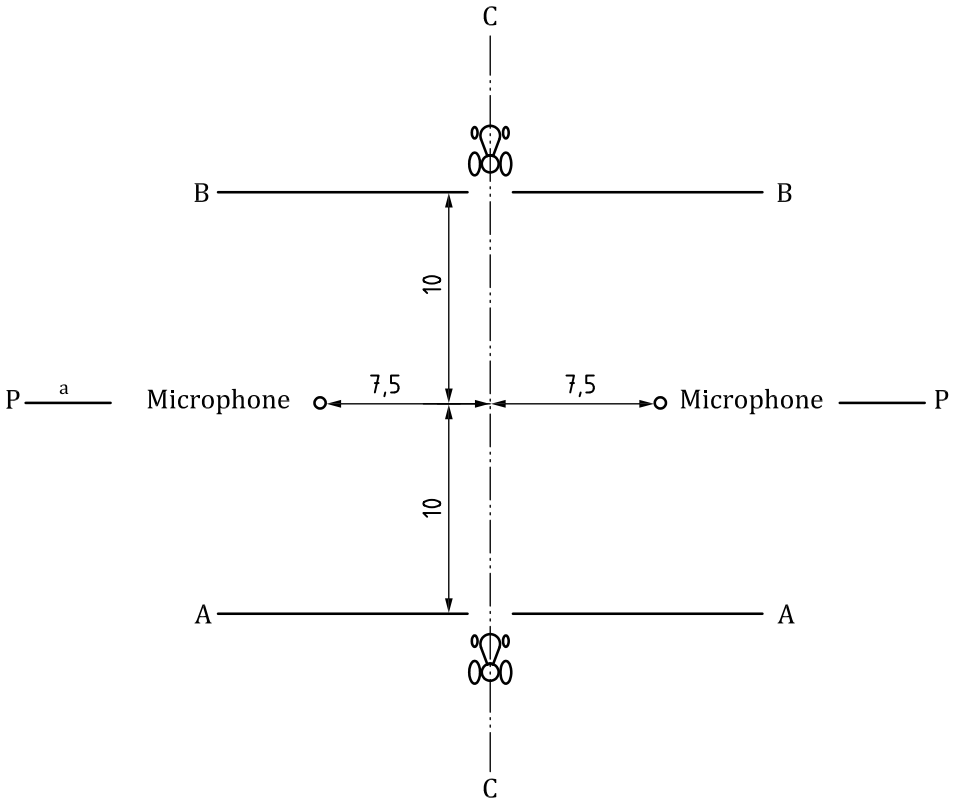
7 Layout of the test area

7.1 The centreline of the track (CC), a line (PP) perpendicular to it and passing through the centre of the test area and two lines (AA and BB) parallel to line PP and 10 m from it shall be marked on the track (see Figure 1).

7.2 The microphone shall be placed 1,2 m above ground and a distance of 7,5 m from the axis of forward movement of the tractor, measured along the perpendicular PP to the axis (see Figure 1).

The microphone shall be oriented in a direction normal to the centreline of the path of travel on the track.

Dimensions in metres



a One microphone position may be eliminated, in which case an additional test run from BB to AA is required.

Figure 1 — Layout of the test area — Microphone position

8 Condition of tractor

8.1 Measurement will be made on the unballasted tractor with no load and without trailer or semi-trailer.

8.2 Immediately before the test, the engine shall be brought to its normal operating temperature.

8.3 The stabilized ground speed to be used will be equal to three-quarters of the attainable maximum in the transmission gear or setting giving the highest speed used for roadwork.

9 Test procedure

9.1 At least two measurements shall be carried out on each side of the tractor. Preliminary measurements to establish governor control setting may be made but shall not be taken into consideration.

9.2 Tractors shall be driven at stabilized ground speed, under the conditions specified in Clause 8, as far as line AA. At this moment, the governor control lever shall quickly be fully opened. The lever shall be held in this position until the tractor has passed line BB and then brought to the minimum position as quickly as possible.

10 Interpretation of results

10.1 Measurements shall be considered valid if the difference between two consecutive measurements on the same side of the tractor does not exceed 2 dB(A).

10.2 The highest sound level measured shall constitute the test result.

11 Test report

The test report shall include the following details:

a) reference to this International Standard

b) name and address of the manufacturer

c) the tractor type, model serial number and transmission type

d) the type and rated speed of the engine

e) a brief description of the silencing system (if provide)

f) whether the tractor is two- or four-wheel drive

g) details of the test site, the testing ground conditions and meteorological conditions

h) sound level meter, make, model, type

i) the number of measurements and the sound pressure levels recorded

j) overall test results

k) date and place of test and signature of the tester.

Annex A
(informative)

Designation of Maintenance Agency

A.1 A Maintenance Agency has been established by the ISO Technical Management Board (TMB) to ensure that technical harmonization can be maintained between ISO/TC 23/SC 2 Standards and OECD Tractor Test Codes. It operates through guidelines approved by the TMB, accessible at http://standards.iso.org/iso/7216 that entrust it to the following functions:

a) to receive the requests for changes from recognized ISO/TC 23/SC 2 P-members;

b) to evaluate and resolve the requests for changes;

c) to publish the approved changes.

A.2 Changes to this International Standard will be announced by the MA Secretariat to ISO/TC 23/SC 2 and will be made publicly available at http://standards.iso.org/iso/7216. They constitute authoritative amendments to Clauses 1 to 11 of this International Standard.

Bibliography

[1] ISO 12934:2013, *Tractors and machinery for agriculture and forestry — Basic types — Vocabulary*

[2] ISO 5700:2013, *Tractors for agriculture and forestry — Roll-over protective structures — Static test method and acceptance conditions*

[3] OECD Code 2: July 2014, *OECD Standard Code for the official testing of agricultural and forestry tractor performance*

(*Continued from second cover*)

The Committee has reviewed the provisions of the following International Standard referred in this adopted standard and has decided that it is acceptable for use in conjunction with this standard:

International Standard	*Title*
ISO 6814 : 2009	Machinery for forestry — Mobile and self-propelled machinery — Terms, definitions and classification

In reporting the result of a test made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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