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भारतीय मानक *मसौदा*

कृषि एवं वानिकी पहिएदार ट्रैक्टर – अधिकतम यात्रा गति – निर्धारण की विधि

(आइ एस 10274 *का दूसरा पुनरीक्षण*)

Draft ***Indian Standard***

AGRICULTURAL AND FORESTRY WHEELED TRACTOR — MAXIMUM TRAVEL SPEED — METHOD OF DETERMINATION

(*Second Revision of* IS 10274)

ICS 65.060.10

Agricultural Machinery and Equipment Sectional Committee, FAD 11

Last date for Comments: **23 October 2025**

FOREWORD

(*Formal clause will be added later)*

This standard was originally published in 1982. Subsequently, the standard was revised in 1993 in order to align it with corresponding ISO 3965 : 1990 with title 'Agricultural wheeled tractors — Maximum speeds — Method of determination', wherein test method for calculating the maximum design speed was included.

The second revision of the standard incorporates the following modifications:

a) The scope of the standard has been widened to include forestry tractors as well and the title of the standard has been modified accordingly.
b) An additional test requirement has been included, specifying that the gear ratio used for measuring maximum travel speed shall be the one that delivers the highest vehicle speed and the throttle shall be fully open.
c) Tolerance between the declared maximum design speed and the measured maximum travel speed has been provided.
d) A note has been included in Table 1 to refer to other standards or publications for tyre sizes or tyre-rim combinations not listed in the table.

In revision of this standard, assistance has been derived from AIS 116 - Maximum Design Speed of Agricultural tractors, issued by Automotive Research Association of India, Pune.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (second revision)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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Draft ***Indian Standard***

Agricultural and forestry wheeled tractor — Maximum travel speed — Method of Determination

(*Second Revision of* IS 10274)

1 SCOPE

This Indian Standard specifies a method for calculating the maximum design speed, method for measuring the maximum travel speed of agricultural and forestry wheeled tractors (hereinafter called as tractors) and corresponding tolerance on declared maximum design speed.

2 REFERENCES

The following standards contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

IS No.	*Title*
IS 13154 : 2015	Automotive vehicles — Tyres for agricultural vehicles and their trailers — Specification (*first revision*)

3 MAXIMUM DESIGN SPEED CALCULATION

The maximum design speed shall be calculated with the following parameters as specified by the manufacturer:

a) the rated engine rotational frequency (rated engine speed)

b) the transmission gear ratio for the highest (fastest) forward gear, and

c) the dynamic radius index, calculated in accordance with Annex A of the maximum size drive wheel tyres recommended by the tractor manufacturer for road use.

NOTE — Rated engine speed is the engine speed specified by the tractor manufacturer for continuous operation at full load.

4 MAXIMUM TRAVEL SPEED MEASUREMENT

4.1 Test Requirements

4.1.1 *Tractor*

4.1.1.1 The fuel specified in the operation manual shall be used.

4.1.1.2 The settings for the carburetor and ignition and/or the fuel injection pump, the engine power and the no-load engine rotational frequency shall be as specified by the manufacturer.

4.1.1.3 Front wheel drive or any additional (power) driving axle shall only be engaged when recommended by the manufacturer for road use.

4.1.1.4 The tyres shall be of the same stated size as those used to calculate maximum design speed (*see* **3**). The tyres shall be new and inflated to the pressure indicated by the tractor manufacturer for road use.

4.1.1.5 The gear ratio used during the test shall be that producing the maximum vehicle speed and throttle shall be fully open.

4.1.1.6 During the test, the ~~agricultural and forestry wheeled~~ tractor shall be un-laden and in running order without removable ballast weights or special equipment.

4.1.2 *Test Roadway*

4.1.2.1 The roadway shall be straight and allow the maximum speed to be maintained for a minimum test distance of 100 m.

4.1.2.2 The surface shall be dry, smooth concrete for similar finish, swept clean.

4.1.2.3 The surface shall not have more than 1.5 percent slope in the direction of travel and not more than 1.5 percent slope at right-angles to the direction of travel.

4.1.2.4 The approaches to the test roadway shall be of sufficient length, smoothness and uniformity of slope to ensure a uniform travel speed of the tractor immediately prior to the test measurement.

4.1.3 *Meteorological Conditions ~~Ambient Conditions~~*

The test shall be conducted ~~made~~ in dry and calm weather with wind velocity not exceeding 5 m/s.

4.2 Test Procedure

4.2.1 Immediately prior to the test, the tractor shall be run for a period sufficient to ensure that the engine, transmission oils and coolant are at normal working temperatures. These temperatures shall be maintained during the test.

4.2.2 Drive the tractor over the test roadway with the throttle fully open in the forward gear producing maximum tractor speed.

4.2.3 Measure the maximum travel speed over a distance of at least 100 m first in one direction on the test roadway and then in the opposite direction. The time interval for a point on the machine to traverse 100 m shall be recorded.

4.2.4 Determine the maximum travel speed as the mean of the results of the two successive test drives in opposite directions.

5 MEASURING TOLERANCES

Following tolerances shall be considered to take account of various unavoidable errors due to the measuring technique and to the increase in running speed of the engine with a partial load.

5.1 The variation of ± 3 kmph in declared maximum design speed and measured speed shall be acceptable.

5.2 An additional ± 5 percent tolerance shall be permitted to take into account variations due to tyre size.

6 TEST REPORT

6.1 The test report shall be in accordance with the specimen as given in Annex B**.**

ANNEX A

(*Clause* 3)

DYNAMIC RADIUS INDICES FOR CALCULATION OF THE FORWARD GROUND SPEED [1] (TYRES OF DIAGONAL AND RADIAL CONSTRUCTION)

Tyres Size Designation		Dynamic Radius Indices[2]
Diagonal	**Radial**	**mm**
(1)	(2)	(3)
8.3-24	8.3 R 24	470
9.5-24	9.5 R 24	495
9.5-32	9.5 R 32	595
9.5-36	9.5 R 36	645
11.2-24	11.2 R 24	515
11.2-28	11.2 R 28	565
12.4-24	12.4 R	540
12.4-28	12.4 R	590
12.4-32	12.4 R	640
12.4-36	12.4 R	690
12.4-38	12.4 R	720
13.6-24	13.6 R	560
13.6-28	13.6 R	610
13.6-36	13.6 R	715
13.6-38	13.6 R	740
14.9-24	14.9 R	590
14.9-26	14.9 R	615
14.9-28	14.9 R	640
14.9-30	14.9 R	665
14.9-38		765
15.5-38	155 R	745
16.9-24	16.9 R	620
16.9-26	16.9 R	645
16.9-28	16.9 R	670
16.9-30	16.9 R	695
16.9-34	16.9 R	745
16.9-38	16.9 R	795
18.4-26	18.4 R	670
18.4-30	18.4 R	720
18.4-34	18.4 R	770
18.4-38	18.4 R	820
20.8-34	20.8 R	810
20.8-34	20.8 R	855
23.1-26		730
23.1-30		790
23.1-34		840
24.5-32		835
28 L-26		730

30.5 L-32	845

[1] Designers are reminded that practical speed limits may be imposed by appropriate legislative bodies.
[2] The values listed do not include the manufacturing tolerances of the types.

NOTE — For any other tyre size or tyre-rim combination, kindly refer to the IS 13154 as amended from time to time or any equivalent international standard like ECE,JATMA, ETRTO, T&RA or ITTAC

ANNEX B

(*Clause* 6.1)

SPECIMEN TEST REPORT — MAXIMUM TRAVEL SPEED MEASUREMENT

B-1 The test report shall contain the following information:

a) Reference to this Indian Standard;

b) Type of tractor and drive type (two-wheel drive or four-wheel drive with the front-wheel drive engaged or disengaged);

c) Make of tractor;

d) The chassis number or identification of the tractor;

e) Rated engine rotational frequencies (rated engine speed) and fly-up engine rotational frequencies in revolution per minute (r/min)

f) Type of transmission;

g) Mass of the tractor as tested in kilograms;

h) Tyre size:

1) Rear axle,

2) Front axle;

j) Tyre pressure in kilopascals, and rolling radius of tyres used in the test;

k) Confirmative of the text track being dry;

m) Type of test track, that is concrete, asphalt, etc;

n) Longitudinal gradient of test track, that is level or up to 1.5 percent slope;

p) Slope at right-angles of test track;

q) Tractor gear at which test was conducted;

r) Meteorological conditions, including wind velocity in metre per second;

s) Tractor speed measurements in accordance with the table as shown below:

Test No.	**Direction of Travel (for example left to right, right to left)**	**Time Interval t**	**Tractor Speed[1)]** $v = \frac{3.6l}{t}$
		s	**km/h**
(1)	(2)	(3)	(4)
1		t_1	v_1
2		t_2	v_2

[1)] where l is the test length, in metres (100 m minimum, *see* **4.2.3**)

t) Test speed, v of the tractor in kilometres per hour, determined according to following formula:

$$v = \frac{v_1 + v_2}{2}$$

The value of speed v shall be rounded to the second decimal digit for individual measurements and to the first decimal digit for the average value.