

Methods for

Determination of braking performance of agricultural and forestry vehicles —

[ISO title: Agricultural and forestry vehicles — Determination of
braking performance]

UDC [630*37 + 631.372]:629.11-592

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Committees responsible for this British Standard

This British Standard was published under the direction of the Agricultural Machinery and Implements Standards Committee AGE/-. Its preparation was entrusted to Technical Committee AGE/6 upon which the following bodies were represented:

- Agricultural Engineers' Association
- British Agricultural and Garden Machinery Association Ltd.
- County Surveyors' Society
- Department of Industry (Mechanical Engineering)
- Forestry Commission
- Health and Safety Executive
- Home Timber Merchants' Association of Scotland
- Ministry of Agriculture, Fisheries and Food
- National Farmers' Union
- National Institute of Agricultural Engineering
- National Union of Agricultural and Allied Workers
- Society of Motor Manufacturers and Traders Limited
- Coopted member

This British Standard, having been prepared under the direction of the Agricultural Machinery and Implements Standards Committee, was published under the authority of the Board of BSI and comes into effect on 29 July 1983

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The following BSI references relate to the work on this standard:
Committee reference AGE/6
Draft for comment 81/74284 DC

ISBN 0 580 13337 0

Amendments issued since publication

Amd. No.	Date of issue	Comments

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National foreword

This British Standard has been prepared under the direction of the Agricultural Machinery and Implements Standards Committee. It is identical with ISO 5697 “*Agricultural and forestry vehicles — Determination of braking performance*”, which was developed by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, and was published in 1982 by the International Organization for Standardization (ISO).

Terminology and conventions. The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Wherever the words “International Standard” appear, referring to this standard, they should be read as “British Standard”.

Cross-reference

International Standard	Corresponding British Standard
ISO 3965:1977	BS 5510:1977 <i>Methods for determination of maximum travel speed of agricultural wheeled tractors</i> (Identical)

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope and field of application

This International Standard specifies methods of measuring the performance of service brakes, based on measured deceleration and on measured stopping distance, and of parking brakes of agricultural and forestry vehicles.

It is applicable to:

- a) tractors and self-propelled vehicles having a maximum design speed exceeding 6 km/h;

- b) trailed agricultural vehicles designed for use at speeds exceeding 6 km/h, comprising agricultural trailers, towed agricultural machines and implements.

2 Reference

ISO 3965, *Agricultural wheeled tractors. Determination of maximum travel speed.*

Section 1. General

3 Definitions

For the purpose of this International Standard, the following definitions apply.

3.1

agricultural tractor

a self-propelled wheeled or track-laying vehicle, more particularly designed to pull, push, carry and operate implements including trailers used for agricultural work (including forestry work). It may be provided with a detachable loading platform

3.2

self-propelled agricultural vehicle

any vehicle, other than a tractor, having its own means of propulsion, which is used in agriculture or forestry and which according to its design and the devices fixed to the vehicle is suitable and intended for doing the work

such vehicles may be equipped to pull implements and trailers. Additionally, there may be means for receiving the implements and devices required for doing work as well as for intermediate storing of materials which are produced and/or needed during the work

3.3

agricultural trailer

a transport vehicle used in agriculture or forestry and which, according to its design, is suitable and intended for coupling to an agricultural tractor or to a self-propelled agricultural vehicle

the term “agricultural trailer” includes agricultural semitrailers, only part of the mass of which is supported by the axle or axles

3.4

agricultural machine or implement

a trailed vehicle used in agriculture or forestry and which, according to its design and the devices fixed to the vehicle, is suitable and intended for doing the work

additionally, there may be means for receiving the implements and devices required for doing work as well as for intermediate storing of materials which are produced and/or needed during the work

3.5

unladen mass

mass of the unladen vehicle

3.6

unladen vehicle

a vehicle in running order, complete with fuel, coolant and lubricant (where appropriate) and carrying a driver (if applicable) of 75 kg but not attendants, optional accessories or load

3.7

laden vehicle

unless otherwise stated, a vehicle so laden as to attain its maximum mass

3.8

maximum axle load

the technically permissible axle load for each axle stated by the manufacturer. (The sum of the maximum axle loads may be higher than the technically permissible maximum mass of the vehicle)

3.9

maximum mass

the technically permissible maximum mass of the vehicle stated by the manufacturer. (This may be higher than the maximum mass authorized by a national administration)

3.10 braking device

A combination of parts, the function of which is to reduce the speed of a moving vehicle or to bring it to a halt or to keep it stationary if already halted. The braking device consists of the braking device control, the braking device transmission and the brakes themselves.

3.10.1

braking device control

the part of the braking device actuated directly by the driver to supply to the braking device transmission the energy required for operating the brakes

3.10.2

braking device transmission

the combination of components connecting the braking device control and the brakes

the transmission may be mechanical, hydraulic, pneumatic, electrical or mixed. If the braking power is derived from, or assisted by, a source of energy independent of, but controlled by, the driver, the reserve of energy in the device is regarded as part of the transmission

3.10.3

brake

the element of the braking device in which the forces opposed to the motion or tendency to motion are produced

3.11

service braking device

a device, the function of which is to reduce the speed of a moving vehicle or to bring it to a halt

3.12**parking braking device**

assembly of parts by means of which the vehicle can be maintained at rest even on a slope and in the absence of the driver

3.13**retarder**

a device, the function of which is either to assist the service braking device or to reduce the speed but not to stop the vehicle

3.14**over-run (inertia) braking device**

a braking device in which the energy needed to produce the braking force is generated by movement of the towed vehicle towards the towing vehicle

3.15**spring brake**

a braking device in which the energy required for braking is supplied by one or more springs acting as an energy accumulator

3.16**brake control input force**

the sum of all forces applied by the operator to the braking device control(s), measured at the point of load application, in a line from the point of application through the operator's hip joint for foot pedal controls, or through the arm to shoulder joint for hand operated controls

3.17**stopping distance**

the distance travelled by a vehicle between the point at which the first movement of the braking device control is made, and the point at which the vehicle comes to a halt

3.18**mean deceleration**

the average deceleration calculated from initial speed and stopping distance as defined by the formula

$$a = \frac{v^2}{2s}$$

where

- a is the average deceleration, in metres per second squared;
- v is the initial speed, in metres per second;
- s is the stopping distance, in metres.

3.19**measured deceleration**

the mean of the sustained deceleration recorded, for example, on a decelerometer

3.20**release pressure**

the pressure required, within the transmission system of a fluid or pneumatic released spring brake, to release the brakes fully

3.21**release force**

the force required, on the control of a mechanically released spring brake, to release the brakes fully

3.22**maximum design speed**

see ISO 3965

4 General requirements

The following general requirements shall be observed when performing the methods of test specified in this International Standard.

4.1 A towing vehicle shall be fitted with components intended by the manufacturer for the operation of the towed vehicle braking devices if the latter affect the braking performance of the towing vehicle.

4.2 The vehicle's condition, as regards mass, shall be as specified for each type of test and shall be recorded in the test report.

4.3 The test track or test site shall have a dry, clean concrete, bituminous or equivalent surface, affording good adhesion.

4.4 The test shall be performed when the wind velocity is below 10 m/s.

4.5 The ambient temperature shall be within the range $-10\text{ }^{\circ}\text{C}$ to $+35\text{ }^{\circ}\text{C}$ and shall be recorded.

4.6 The braked axle(s) shall be equipped with the largest diameter tyres specified by the vehicle manufacturer. The tyres shall be inflated to the pressure(s) specified by the vehicle manufacturer.

4.7 Prior to the start of a series of tests, the brakes shall have been fully bedded in (burnished) and adjusted in accordance with the manufacturer's instructions. Thereafter, the brakes shall not be further manually adjusted during the same series of tests.

At the start of each test, the brakes shall be cold. A brake is deemed to be cold if one of the following conditions is met:

- a) the temperature measured on the disc or on the outside of the drum is below $100\text{ }^{\circ}\text{C}$;
- b) in the case of totally enclosed brakes, including oil-immersed brakes, the temperature measured on the outside of the housing is below $50\text{ }^{\circ}\text{C}$, or within the manufacturer's specifications;
- c) the brakes have not been actuated in the previous 1 h.