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(en)

Agricultural tractors - Requirements for steering
(ISO 10998:2008, IDT)

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Contents

Page

Foreword.....	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions.....	1
3.1 General terms.....	1
3.2 Steering parameters.....	3
3.3 Types of steering equipment.....	4
3.4 Types of steering transmission.....	5
4 General provisions for testing.....	6
5 Requirements, test procedures and acceptance criteria.....	6
5.1 Predictable response of the tractor.....	6
5.2 Steering response behaviour.....	7
5.3 Actuating forces/reaction forces.....	7
5.4 Simulation of failures (increased steering forces).....	8
5.5 Energy supply/reserve and warnings.....	10
5.6 Adjustment devices/care/maintenance.....	11
5.7 Strength/durability of components.....	11
5.8 Steering systems containing complex electronic control systems.....	12
Annex A (normative) Special requirements to be applied to the safety aspects of complex electronic tractor control systems.....	13
Bibliography.....	18

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.

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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 10998 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 4, *Tractors*.

This second edition cancels and replaces the first edition (ISO 10998:1995), which has been technically revised.

Preview
ISO 10998:2008

Agricultural tractors — Requirements for steering

1 Scope

This International Standard specifies performance and safety requirements for both normal and emergency steering modes of agricultural tractors. It is applicable to those tractors having a maximum design speed, measured in accordance with ISO 3965, not exceeding (60 ± 3) km/h.

It is not applicable to track-laying tractors equipped with steel tracks having a maximum design speed, measured in accordance with ISO 3965, not exceeding (15 ± 3) km/h.

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 789-11:1996, *Agricultural tractors — Test procedures — Part 11: Steering capability of wheeled tractors*

ISO 3965:1990, *Agricultural wheeled tractors — Maximum speeds — Method of determination*

ISO 7000:2004, *Graphical symbols for use on equipment — Index and synopsis*

ISO 14982:1998, *Agricultural and forestry machinery — Electromagnetic compatibility — Test methods and acceptance criteria*

ISO 19879:2005, *Metallic tube connections for fluid power and general use — Test methods for hydraulic fluid power connections*

3 Terms and definitions

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

3.1 General terms

3.1.1

agricultural tractor

power-driven vehicle, either wheeled and having at least two-axes or tracklaying, whose function depends essentially on its tractive power, and which is specially designed to pull, push, carry or actuate certain implements, machines or trailers intended for use in agriculture or forestry

NOTE Such a tractor can be arranged to carry a load and/or attendants as specified in ISO 23205.

3.1.2

steering equipment

all components whose purpose is to determine the direction of movement of the tractor, comprising **steering control** (3.1.3), **steering transmission** (3.1.4), **steered wheels** (3.1.7) or tracks, and **energy supply** (3.1.8) if any

ISO 10998:2008(E)**3.1.3****steering control**

part of the steering equipment which controls steering operation

NOTE It may be operated with or without the direct intervention of the driver. For steering equipment in which the steering forces are provided solely or partly by the muscular effort of the driver, the steering control includes all parts from the driver interface up to the point where the steering effort is transformed by mechanical, hydraulic or electrical means.

3.1.4**steering transmission
transmission**

all parts of the steering equipment providing the means of transmitting the steering forces between the steering control and the steered wheels or tracks

NOTE 1 It includes all parts from the point where the steering control effort is transformed by mechanical, hydraulic or electrical means.

NOTE 2 The steering transmission is divided into two independent functions: The **control transmission** (3.1.4.1) and the **energy transmission** (3.1.4.2). Where the term "steering transmission" or "transmission" is used alone in this International Standard, it encompasses both control transmission and energy transmission. A distinction is drawn between mechanical, electrical and hydraulic transmission systems or combinations thereof, according to the means by which the signals and/or energy is transmitted.

3.1.4.1**control transmission**

all components by means of which signals are transmitted for control of the steering equipment

3.1.4.2**energy transmission**

all components by means of which the energy required for control/regulation of the steering function of the wheels is transmitted

3.1.5**autonomous steering system**

system that incorporates a function within a complex electronic control system that causes the tractor to follow a defined path or to alter its path in response to signals initiated and transmitted from off-board the tractor

NOTE The driver will not necessarily be in primary control of the tractor.

3.1.6**advanced driver assistance steering system**

system, additional to the main steering system, that provides assistance to the driver in steering the tractor, but where the driver remains at all times in primary control of the tractor

NOTE The advanced driver assistance steering system comprises the **automatically commanded steering function** (3.1.6.1) and/or **corrective steering function** (3.1.6.2).

3.1.6.1**automatically commanded steering function**

function within a complex electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the tractor, possibly in conjunction with passive infrastructure features, to generate continuous control action in order to assist the driver in following a particular path, in low speed manoeuvring or parking operations

3.1.6.2**corrective steering function**

discontinuous control function within a complex electronic control system whereby, for a limited duration, changes to the steering angle of one or more wheels or tracks can result from the automatic evaluation of signals initiated on-board the tractor, in order to maintain the basic desired path of the tractor or to influence the tractor's dynamic behaviour

NOTE Systems that do not themselves positively actuate the steering system but that — possibly in conjunction with passive infrastructure features — simply warn the driver of a deviation from the ideal path of the tractor or of an unseen hazard by means of a tactile warning transmitted through the steering control, are also considered to be corrective steering.

3.1.7

steered wheels

wheels, the alignment of which may be altered directly or indirectly in relation to the longitudinal axis of the tractor in order to determine the direction of movement of the tractor

NOTE 1 The steered wheels include the axis around which they are rotated in order to determine the direction of movement of the tractor. Endless tracks of tracklaying tractors and all wheels of skid steered tractors are considered to be steered wheels for the purposes of this International Standard.

NOTE 2 In the case of tractors with **articulated steering equipment** (3.3.6.2), all wheels of the tractor are considered to be steered wheels for the purposes of this International Standard.

3.1.8

energy supply

parts of the steering equipment which provide energy, control energy, and where appropriate, process and store energy

NOTE The energy supply also includes any storage reservoirs for the operating medium and the return lines, but does not include the tractor engine (except for the purposes of 5.4.1.3), nor the drive between it and the energy source

3.1.8.1

energy source

part of the energy supply which provides the energy in the required form

EXAMPLE Hydraulic pump, air compressor, manual exertion.

3.1.8.2

energy reservoir

part of the energy supply in which the energy provided by the energy source is stored

EXAMPLE Pressurized fluid reservoir, tractor battery.

3.1.8.3

storage reservoir

part of the energy supply in which the operating medium is stored

EXAMPLE Fluid reservoir at or near atmospheric pressure.

3.1.9

maximum mass

maximum allowable tractor mass as stated by the manufacturer

3.1.10

continuous

without step changes in response to changing input

3.2 Steering parameters

3.2.1

steering control effort

force applied to the steering control in order to steer the tractor

3.2.2

steering time

period of time from the beginning of the movement of the steering control to the moment at which the steered wheels have reached a specific steering angle

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