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**Tractors for agriculture and  
forestry — Roll-over protective  
structures on narrow tractors —**

**Part 2:  
Rear-mounted ROPS**

*Tracteurs agricoles et forestiers — Structures de protection contre le  
retournement (ROPS) pour tracteurs à voie étroite —*

*Partie 2: ROPS montées à l'arrière*



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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 2, *Common tests*.

This third edition cancels and replaces the second edition (ISO 12003-2:2008), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the main title has been changed, referencing type of tractor, from “Agricultural and forestry tractors” to “Tractors for agriculture and forestry”;
- the seat anchorage test procedures of OECD have been added as an optional test;
- the ergonomic folding ROPS test procedures of OECD have been added as an optional test;
- definitions for unballasted mass, plane, track width and maximum permissible mass have been added
- tractor mass limits for unballasted tractor has been specified;
- the allowable mass ratio (1,75) has been specified;
- reference mass limits have been added;
- tractor lashings method of lashing has been changed;
- seat position during test has been updated to include seats with adjustable backrest,
- clearance zone has been updated for clarity and information for reversible seat has been added;
- [Figure 17](#) has been updated to be harmonize with OECD Code 6; specifically, the key “g” has been added to indicate failure at any stage when load drops below  $0,8F_{\max}$ ;
- cold weather embrittlement test has been added;

— reversible seat operator seat zones has been updated to harmonize with OECD code 7.

A list of all parts in the ISO 12003 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Testing of roll-over protective structures (ROPS) for narrow tractors for agriculture and forestry intends to minimize the likelihood of driver injury resulting from accidental overturning during normal operation (e.g. field work) of the tractor. The strength of the roll-over protective structure is tested by applying loads to simulate actual loads which can be imposed on the cab or frame when the tractor overturns either to the rear or to the side without free fall. The tests allow observations to be made on the strength of the structure and the attachment brackets to the tractor and also of the tractor parts that may be affected by the load imposed on the structure. This document also includes optional testing for seat anchorage points and folding efforts of rear-mounted roll-over protective structure designed to fold.

The tests are made using special rigs that are intended to simulate such loads as are imposed on a protective structure, when the tractor overturns. These tests enable observations to be made on the strength of the protective structure and any brackets attaching it to the tractor and any parts of the tractor which transmit the test load.

Provision is made to cover both tractors with the conventional forward-facing driving position only and those with a reversible driving position, which is in agreement with the relevant OECD test code practice (see Reference[4]). For tractors with a reversible driving position, a clearance zone is defined to be the combined clearance zones for the two driving positions.

It is recognized that there can be designs of tractors, such as lawn-mowers, and certain forestry machines such as forwarders, for which this document is not appropriate.

NOTE For regular tractors, see ISO 3463[2] (dynamic test) and ISO 5700[3] (static test).





# Tractors for agriculture and forestry — Roll-over protective structures on narrow tractors —

## Part 2: Rear-mounted ROPS

### 1 Scope

This document specifies procedures for both the static and dynamic strength testing of roll-over protective structures (ROPS) rear-mounted on narrow tractors. It defines the clearance zone and acceptance conditions for rigid or tiltable, rear, two-post roll bar, frame and cab ROPS, and is applicable to tractors so equipped having the following characteristics:

- a ground clearance of not more than 600 mm beneath the lowest points of the front- and rear-axle housings (not considering lower points on the axle differential);
- a fixed or adjustable minimum track width of one of the two axles of less than 1 150 mm and with the overall width of the other axle being less than that of the first axle, including where the two axles are fitted with rims and tyres of the same size;
- a fixed driving position and a mass greater than 400 kg, unballasted, including the ROPS and tyres of the largest size recommended by the manufacturer;
- a reversible driving position (reversible seat and steering wheel), with a mass greater than 400 kg, unballasted, including the ROPS and tyres of the largest size recommended by the manufacturer and maximum unballasted mass less than 3 500 kg and maximum permissible mass less than 5 250 kg;
- a mass ratio less than 1,75;
- a ROPS of the rollbar, frame or cab type, mounted partly or entirely behind the seat index point and having a zone of clearance whose upper limit is  $(810 + a_v)$  mm above the seat index point in order to provide a sufficiently large area or unobstructed space for the protection of the driver.

This document also specifies optional testing procedures for both seat anchorage points and folding efforts of rear-mounted ROPS designed to fold.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 630-1, *Structural steels — Part 1: General technical delivery conditions for hot-rolled products*

ISO 630-2, *Structural steels — Part 2: Technical delivery conditions for structural steels for general purposes*

ISO 630-3, *Structural steels — Part 3: Technical delivery conditions for fine-grain structural steels*

ISO 630-4, *Structural steels — Part 4: Technical delivery conditions for high yield strength quenched and tempered structural steel plates and wide flats*

ISO 2408, *Steel wire ropes — Requirements*

ISO 5353, *Earth-moving machinery, and tractors and machinery for agriculture and forestry — Seat index point*

ISO 13854:2017, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

ISO 12003-1:2021, *Tractors for agriculture and forestry — Roll-over protective structures on narrow tractors — Part 1: Front-mounted ROPS*

ISO 12934, *Tractors and machinery for agriculture and forestry — Basic types — Vocabulary*

ISO 80000-1, *Quantities and units — Part 1: General*

ASTM A370, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12934 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1 roll-over protective structure ROPS

framework protecting drivers of *agricultural tractors* (3.15), which minimizes the likelihood of driver injury resulting from accidental overturning during normal field work

Note 1 to entry: The ROPS is characterized by the provision of space for a clearance zone, either inside the envelope of the structure or within a space bounded by a series of straight lines from the outer edges of the structure to any part of the tractor that might come into contact with the ground; it is capable of supporting the tractor in an overturned position.

#### 3.2 rear-mounted ROPS

two-post, roll-bar-type, *roll-over protective structure* (3.1) mounted on the tractor rearwards of the driving seat, or a frame or cab

Note 1 to entry: Compare with front-mounted ROPS described in ISO 12003-1.

#### 3.3 unballasted mass

mass of the tractor in working order with tanks and radiators full, *roll-over protective structure* (3.1) 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]

#### 3.4 maximum permissible mass

$m_{\max}$

maximum mass of the tractor stated by the manufacturer to be technically permissible and declared on the vehicle's identification plate and/or in the operator's handbook