
**Agricultural and forestry tractors —
Roll-over protective structures on
narrow-track wheeled tractors —**

**Part 1:
Front-mounted ROPS**

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

Partie 1: ROPS montées à l'avant



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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 12003-1 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 2, *Common tests*.

This second edition cancels and replaces the first edition (ISO 12003-1:2002), which has been technically revised.

ISO 12003 consists of the following parts, under the general title *Agricultural and forestry tractors — Roll-over protective structures on narrow-track wheeled tractors*.

- *Part 1: Front-mounted ROPS*
- *Part 2: Rear-mounted ROPS*

Introduction

Testing of roll-over protective structures (ROPS) for narrow-track tractors for agriculture and forestry aims at minimizing the likelihood of driver injury resulting from accidental overturning during normal operation (e.g. field work) of the tractor. The strength of the front-mounted ROPS is tested by applying either static or dynamic (impact) loads to simulate actual loads which may be imposed on the front-mounted ROPS 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 front-mounted ROPS and the attachment brackets to the tractor and also of the tractor parts that may be affected by the load imposed on the front-mounted ROPS.

Provision is made to cover both tractors with the conventional forward facing driver's position only and those with a reversible driver's position, which is in agreement with the relevant OECD test code practice (Reference [5]). For tractors with a reversible driver's position, a clearance zone is defined to be the combined clearance zones for the two driving positions.

It is recognized that there may be designs of tractors, e.g. lawn-mowers, and certain forestry machines such as forwarders, for which this part of ISO 12003 is not appropriate.

NOTE For regular tractors, see ISO 3463^[3] (dynamic test) and ISO 5700^[4] (static test).

Agricultural and forestry tractors — Roll-over protective structures on narrow-track wheeled tractors —

Part 1: Front-mounted ROPS

1 Scope

This part of ISO 12003 specifies procedures for both the static and dynamic testing of roll-over protective structures (ROPS) front-mounted on narrow-track wheeled agricultural and forestry tractors. It defines the clearance zone and acceptance conditions for rigid or tiltable, front, two-post ROPS, including any associated rear fixtures, 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 when fitted with the widest specified tyres. It is understood that the axle mounted with the wider tyres is set at a track width of not more than 1 150 mm. It shall be possible to set the track width of the other axle in such a way that the outer edges of the narrower tyres do not extend beyond the outer edges of the tyres of the other axle. Where the two axles are fitted with rims and tyres of the same size, the fixed or adjustable track width of the two axles shall be less than 1 150 mm.
- A mass greater than 600 kg but less than 3 000 kg, unladen, including the ROPS and tyres of the largest size recommended by the manufacturer.

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 630, *Structural steels — Plates, wide flats, bars, sections and profiles*

ISO 898-1:1999, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs*

ISO 898-2:1992, *Mechanical properties of fasteners — Part 2: Nuts with specified proof load values — Coarse thread*

ISO 2408, *Steel wire ropes for general purposes — Minimum requirements*

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

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

ASAE¹⁾ S313.3, *Soil Cone Penetrometer*

ASAE¹⁾ EP542, *Procedures for Using and Reporting Data Obtained with the Soil Cone Penetrometer*

3 Terms and definitions

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

3.1 roll-over protective structure ROPS

framework protecting drivers of wheeled agricultural and forestry tractors, which minimizes the likelihood of driver injury resulting from accidental overturning during normal field work

NOTE 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 front-mounted ROPS

two-post roll-over protective structure mounted on the tractor in front of the driver and with a reduced clearance zone

NOTE Compare with rear-mounted ROPS described in ISO 12003-2.

3.3 rear fixture

component such as the rear tyre (measured at its specified smallest diameter), mudguard or other rigid tractor components, or all of these, or a supplementary fixture of requisite width, height and strength installed behind the driver's seat, which completes the front-mounted ROPS' clearance zone for strength testing

3.4 tractor mass

mass of the unladen tractor in working order with tanks and radiator full, front-mounted ROPS and any equipment required for normal use

NOTE The operator, optional ballast weights, additional wheel equipment, and special equipment and tools are not included.

3.5 reference mass

mass, not less than the tractor mass, selected by the manufacturer for calculation of loading energies and forces to be applied in the tests

1) American Society of Agricultural Engineers.