
**Agricultural tractors — Rear-mounted
power take-off types 1, 2 and 3 —**

Part 1:

**General specifications, safety
requirements, dimensions for master
shield and clearance zone**

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*Tracteurs agricoles — Prises de force montées à l'arrière des types
1, 2 et 3 —*

*Partie 1: Spécifications générales, exigences de sécurité, dimensions
du bouclier protecteur et de la zone de dégagement*

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Foreword

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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 500-1 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 4, *Tractors*.

This first edition of ISO 500-1, together with the first editions of ISO 500-2 and ISO 500-3, cancels and replaces ISO 500:1991, which has been technically revised.

ISO 500 consists of the following parts, under the general title *Agricultural tractors — Rear-mounted power take-off types 1, 2 and 3*:

- *Part 1: General specifications, safety requirements, dimensions for master shield and clearance zone*
- *Part 2: Narrow-track tractors, dimensions for master shield and clearance zone*
- *Part 3: Main PTO dimensions and spline dimensions, location of PTO*

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Agricultural tractors — Rear-mounted power take-off types 1, 2 and 3 —

Part 1: General specifications, safety requirements, dimensions for master shield and clearance zone

1 Scope

This part of ISO 500 gives general specifications, including speeds, safety requirements, the dimensions for the master shield and clearance zones for rear-mounted power take-offs (PTOs) of types 1, 2 and 3 on agricultural tractors with a track setting of more than 1 150 mm (those with a track setting width of 1 150 mm or less are covered in ISO 500-2).

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 5673-2, *Agricultural tractors and machinery — Power take-off drive shafts and power-input connection — Part 2: Specifications of PTO draft shaft, and PIC position and clearance for attachments*

ISO 6489 (all parts), *Agricultural vehicles — Mechanical connections on towing vehicles*

3 Terms and definitions

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

3.1

power take-off shaft

PTO

external shaft on the rear of the tractor to provide rotational power to implements

4 Specifications

4.1 The tractor rear PTO is classified into three types (see Table 1).

4.2 The direction of PTO rotation shall be clockwise when viewed from behind the tractor.

4.3 The nominal PTO rated rotational frequency may be realized by one or more engine speed ranges.

Table 1 — Characteristics of PTO types

PTO type	Nominal diameter mm	Number and type of splines	Nominal PTO rated rotational frequency min ⁻¹	Recommended PTO power at rated engine speed ^a kW
1	35	6 straight splines	540	up to 60
			1 000 ^b	up to 92
2	35	21 involute splines	1 000	up to 115
3	45	20 involute splines	1 000	up to 275

^a Determined in accordance with ISO 789-1 or OECD Code 1 or 2.

^b This option is not available in North America.

5 PTO-speed requirements for shiftable PTO

5.1 Should more than one ratio between the engine speed and the PTO rotation speed be provided, any change of ratio shall be indicated. In addition, specific design measures shall be taken to ensure that unintentional changes of ratio — in particular changing to a higher rotational speed — cannot occur. This safety device shall operate each time the PTO is engaged.

5.2 A means to indicate when the PTO is operating at which nominal speed shall be provided.

6 Safety requirements

6.1 The PTO master shield, as shown in Figure 1 and Table 2, shall be supplied by the tractor manufacturer and shall be fixed to the tractor. If the same degree of safety protection is reached and the clearance zone is respected, equivalent protection devices (e.g. towing hook or clevis supports) can be used instead of the master shield. In this case, provisions shall be made for anchoring the restraining member of the PTO drive-shaft guard.

6.2 If necessary the PTO master shield, or a part of the shield, may be movable without detachment from the tractor, to facilitate attachment of the PTO drive shaft. The movable portion of the master shield shall be resistant to unintentional movement when in the operating position. The master shield may be made of flexible material.

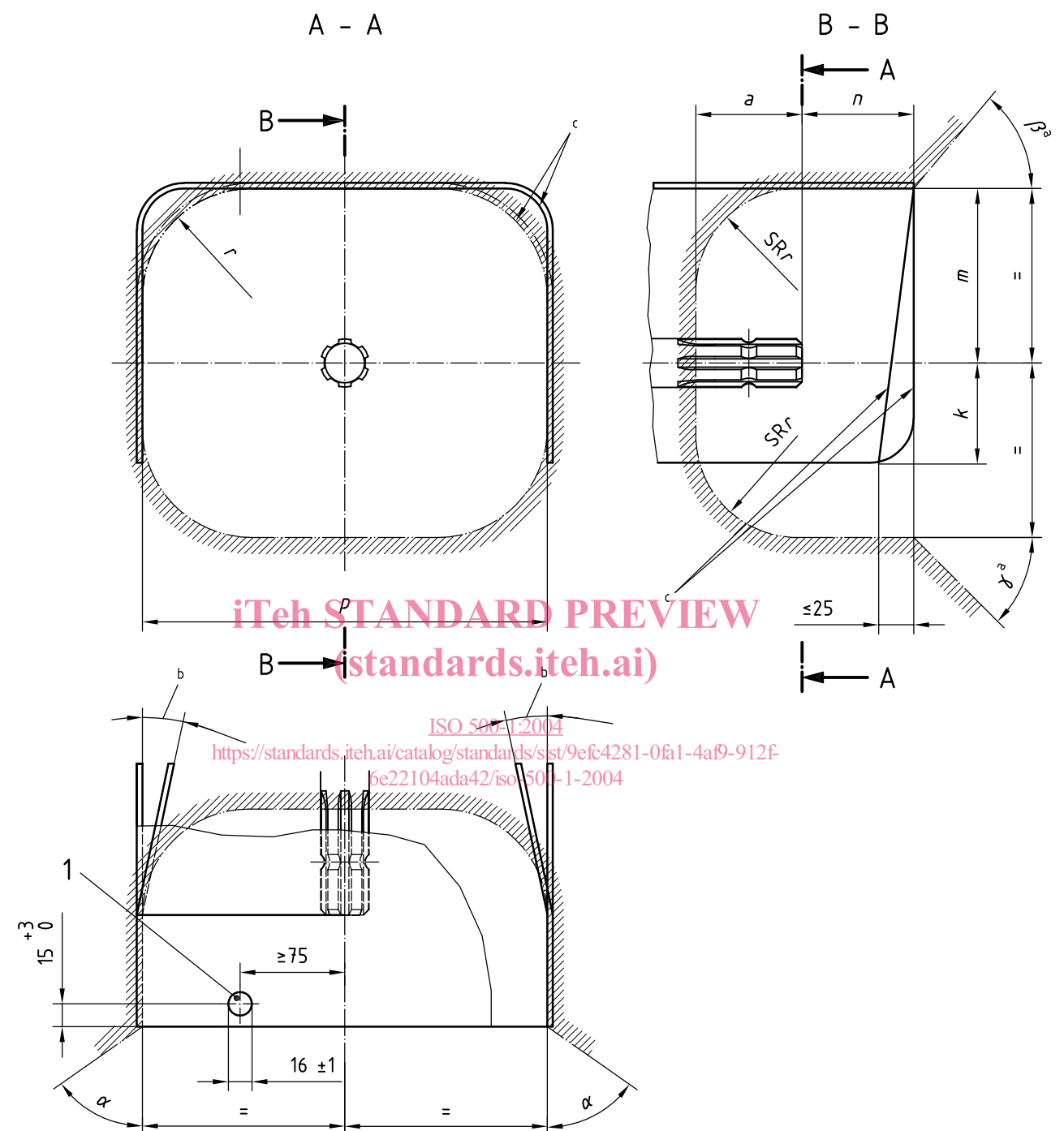
6.3 If the PTO master shield can be used as a step, it shall withstand a vertical static load of 1 200 N without permanent deformation.

6.4 An additional non-rotating casing which fully covers the PTO may also be supplied with the tractor to cover the PTO when the PTO is not in use.

7 Dimensions for tractor master shield aperture and clearance zone of PTO

The dimensions of the tractor master shield aperture and the clearance zone around the PTO shall be in accordance with Figure 1 and Table 2. In Table 2, in addition to dimension *p* of 360 mm for PTO type 3, the dimension of 290 mm is allowed for present tractor designs.

Dimensions in millimetres



Key

- clearance zone
- master shield aperture

- 1 Hole ^d
- a The clearance may be restricted by movable and/or detachable devices. The clearance zone on towing vehicles shall be in accordance with ISO 6489 and ISO 5673-2.
- b Angle optional under consideration of clearance zone.
- c Shape optional.
- d For coupling up the restraining member of the PTO drive shaft guard preventing guard rotation.

Figure 1 — Tractor master shield aperture and clearance zone around PTO

Table 2 — Tractor master shield controlling dimensions for aperture and clearance zone dimensions

Dimension	PTO type		
	1	2	3 ^a
a_{\min}	76 mm	76 mm	90 mm
α_{\min}	60°	60°	60°
β_{\min}	50°	50°	50°
γ_{\min}	45°	45°	45°
SR_{\max}	76 mm	76 mm	90 mm
k_{\min}	70 mm	70 mm	80 mm
$m \pm 5$ mm	125 mm	125 mm	150 mm
$n \pm 5$ mm	85 mm	85 mm	100 mm
$p \pm 10$ mm	290 mm	290 mm	360 mm ^b
r_{\max}	76 mm	76 mm	90 mm

^a For tractors equipped with the PTO type 3 that can be adapted to also provide a PTO type 1 or 2, the master shield need only meet the specifications in Figure 1 and Table 2 for the PTO type 3.

^b In addition, 290 mm is allowed for present tractor designs (see Clause 7).

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- [1] ISO 789-1:1990, *Agricultural tractors — Test procedures — Part 1: Power test for power take-off*
- [2] OECD Code 1, *OECD standard code for the official testing of agricultural and forestry tractor performance*
- [3] OECD Code 2, *OECD restricted standard code for the official testing of agricultural and forestry tractor performance*

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