INTERNATIONAL STANDARD

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Second edition
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Agricultural tractors — Rear-mounted power take-off types 1, 2, 3 and 4 —

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

Tracteurs agricoles — Prises de force montées à l'arrière des types 1, 2, 3 et 4 —

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

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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).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 4, *Tractors*.

This second edition cancels and replaces the first edition (ISO 500-1:2004), of which it constitutes a minor revision. It also incorporates the Corrigendum ISO 500-1:2004/Cor. 1:2005.

ISO 500 consists of the following parts, under the general title *Agricultural tractors — Rear-mounted power take-off types 1, 2, 3, and 4*:

— *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*

Agricultural tractors — Rear-mounted power take-off types 1, 2, 3 and 4 —

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 master shield, and clearance zones for rear-mounted power take-offs (PTOs) of types 1, 2, 3, and 4 on agricultural tractors with a track setting of more than 1 150 mm (those with track setting width of 1 150 mm or less are covered in ISO 500-2).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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: Specification for use of PTO drive shafts, and position and clearance of PTO drive line and PIC for various attachments*

ISO 6489 (all parts), *Agricultural vehicles — Mechanical connections between towed and towing vehicles*

3 Terms and definitions

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

3.1
power take-off
PTO
external shaft on the rear of the tractor to provide rotational power to implements

4 Specifications

4.1 The tractor rear power take-off (PTO) is classified into four types (see Table 1).

4.2 The direction of PTO rotation shall be clockwise when viewed from behind the tractor except when a ground-driven PTO is operated with the tractor in reverse direction.

4.3 The nominal PTO rated rotational frequency can 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	<65
			1 000[b]	<110
2	35	21 involute splines	1 000	<130
3	45	20 involute splines	1 000	<300
4	57,5	22 involute splines	1 300	<450

[a] Determined in accordance with ISO 789-1 or OECD code 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, particularly in 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.

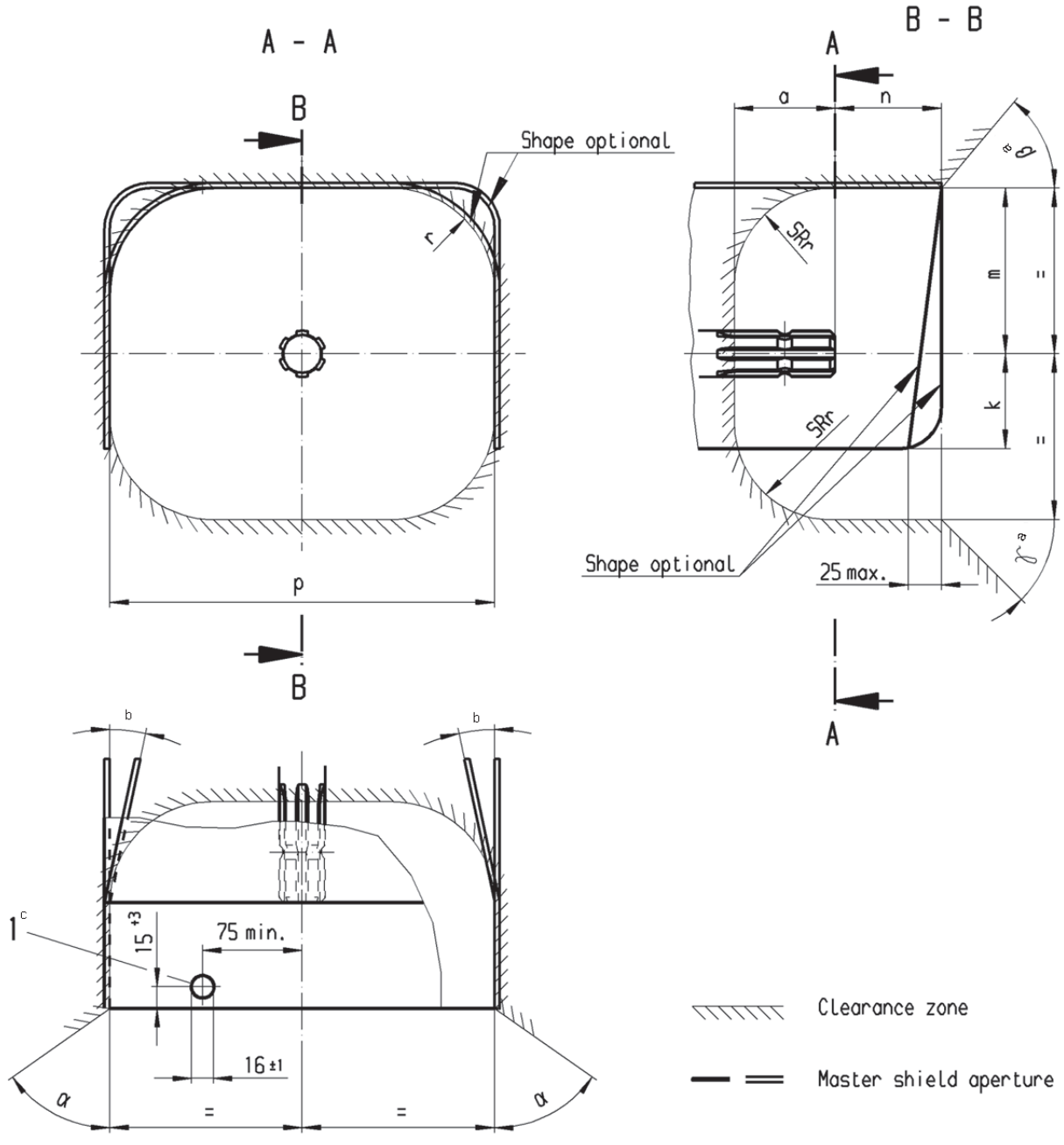
6.2 If necessary, the PTO master shield or a part of the shield can be movable without detachment from the tractor to facilitate attachment of the PTO drive shaft. The movable portion of the master shield shall be resistant to unintentional movement when in the operating position. The master shield can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



Key

1 Hole

a The clearance can be restricted by movable and/or detachable devices. The clearance zone on towing vehicles shall be in accordance with ISO 6489 (all parts) and ISO 5673-2.

b Angle optional under consideration of clearance zone.

c 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]	4[b]
a_{min}	80 mm	80 mm	95 mm	105 mm
α_{min}	60 °	60 °	60 °	60 °
β_{min}	50 °	50 °	50 °	50 °
γ_{min}	45 °	45 °	45 °	45 °
SRr_{max}	76 mm	76 mm	90 mm	90 mm
k_{min}	70 mm	70 mm	80 mm	80 mm
$m \pm 5$ mm	125 mm	125 mm	150 mm	150 mm
$n \pm 5$ mm	85 mm	85 mm	100 mm	100 mm
$p \pm 10$ mm	290 mm	290 mm	360 mm	360 mm
r_{max}	76 mm	76 mm	90 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 only needs to meet the specifications in Figure 1 and Table 2 for the PTO type 3.

[b] For tractors equipped with the PTO type 4 that can be adapted to also provide a PTO type 1, 2, or 3, the master shield only needs to meet the specifications in Figure 1 and Table 2 for the PTO type 4.

Bibliography

[1] ISO 789-1:1990, *Agricultural tractors — Test procedures — Part 1: Power tests for power take-off*

[2] OECD code 2, *OECD standard code for the official testing of agricultural and forestry tractor performance*

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