

INTERNATIONAL STANDARD

ISO
500

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

iTeh STANDARD PREVIEW
*Tracteurs agricoles — Prises de force montées à l'arrière —
Types 1, 2 et 3*
(standards.iteh.ai)

ISO 500:1991

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Reference number
ISO 500:1991(E)

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.

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.

International Standard ISO 500 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*.

This second edition cancels and replaces the first edition (ISO 500:1979), from which drawing requirements have been deleted.

Annex A forms an integral part of this International Standard.

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

1 Scope

This International Standard specifies requirements for types 1, 2 and 3 rear-mounted power take-offs (PTO), the clearance zones around them and protection of the power take-off on agricultural tractors.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4156:1981, *Straight cylindrical involute splines — Metric module, side fit — Generalities, dimensions and inspection.*

ISO 4254-1:1989, *Tractors and machinery for agriculture and forestry — Technical means for ensuring safety — Part 1: General.*

ISO 6489-1:1980, *Agricultural vehicles — Mechanical connections on towing vehicles — Part 1: Hook type — Dimensions.*

ISO 6489-2:1980, *Agricultural vehicles — Mechanical connections on towing vehicles — Part 2: Clevis type — Dimensions.*

ISO 6489-3:—¹⁾, *Agricultural vehicles — Mechanical connections on towing vehicles — Part 3: Tractor drawbar.*

1) To be published.

ISO 6508:1986, *Metallic materials — Hardness test — Rockwell test (scales A - B - C - D - E - F - G - H - K).*

3 Types of power take-off

The main characteristics of the three types of PTO shall be as specified in table 1.

4 Requirements and specifications

4.1 Manufacturing requirements

The dimensions of the main PTO on agricultural tractors shall comply with figure 1, figure 2 or figure 3 and table 2, and table 3 or table 4 as appropriate.

To facilitate coupling, changes of shape at the end (for example, chamfering of splines) of the PTO type 1 profile are admissible.

The hardened portion of the splines shall have a minimum hardness of 48 HRC when tested in accordance with ISO 6508.

4.2 Direction of rotation

The PTO shall rotate clockwise when viewed from behind the tractor.

4.3 Location

On tractors with one PTO shaft, the location of the PTO axis shall lie within the shaded rectangle shown in figure 4.

4.4 Clearance zone

The clearance zone around the PTO shall be in accordance with figure 5 and table 6.

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4.5 Safety related requirements

The master shield, as shown in figure 6 and table 7, shall be supplied by the manufacturer and shall be fixed to the tractor. It may also be hinged and/or be able to slide. If the same degree of safety is reached, equivalent protection devices (e.g. towing hook or clevis supports) can be used instead of the master shield. In this case, provision shall be made for anchoring the PTO drive-shaft guard.

Safety requirements given in ISO 4254-1 shall also be met.

Table 1 — Characteristics of PTO types

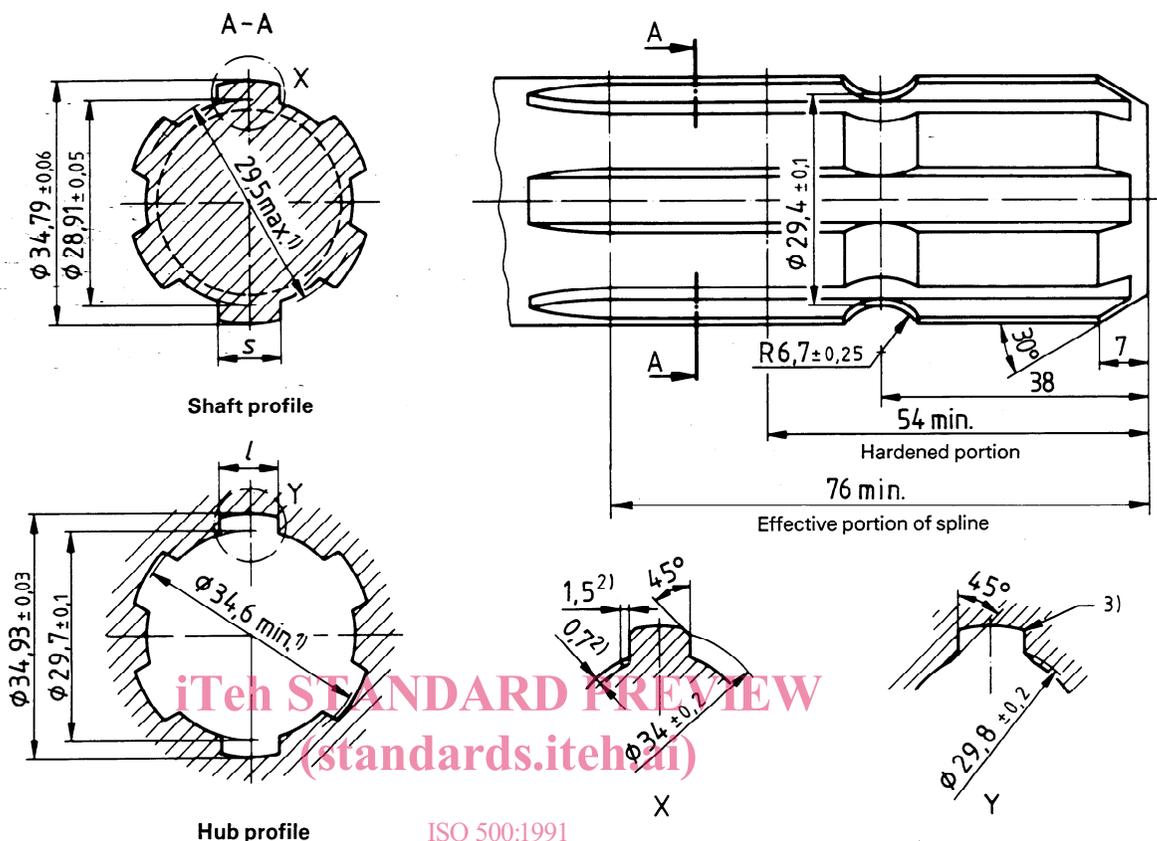
PTO type	Nominal diameter mm	Number and type of splines	PTO rated rotational frequency min ⁻¹
1	35	6 straight splines	540
2	35	21 involute splines	1 000
3	45	20 involute splines	1 000

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Dimensions in millimetres



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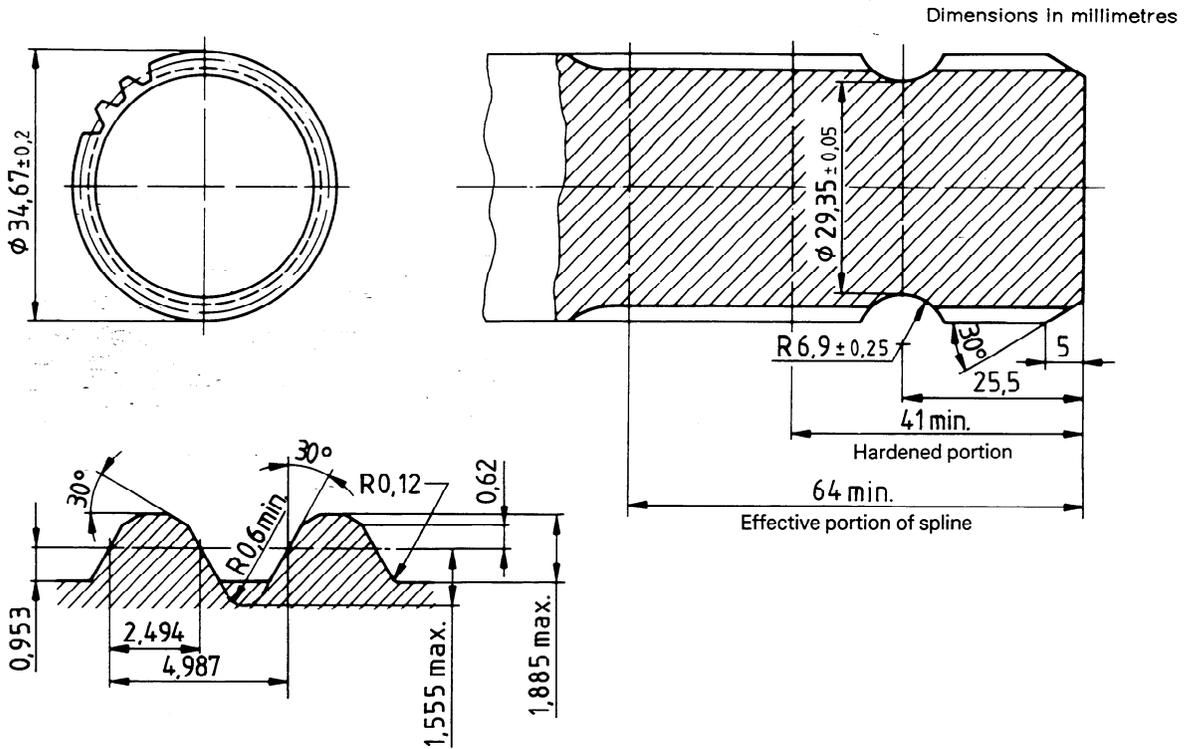
- 1) Form diameter. (For definition see ISO 4156.)
- 2) With or without tooth relief.
- 3) Size of chamfer to be chosen by the manufacturer.

Figure 1 — PTO, type 1

Table 2 — PTO, type 1, tolerances for splines

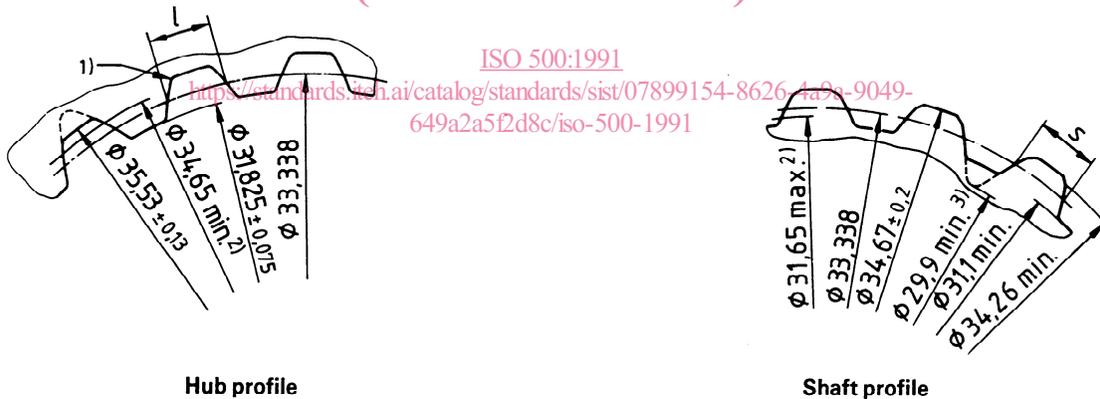
Dimensions in millimetres

PTO type 1	Hub		Shaft	
	/		s	
Nominal dimension	8,69		8,69	
Test dimension	Individually measured	8,74 8,71	Individually measured	8,60 8,53
	"GO" plug gauge	8,69 min.	"GO" ring gauge	8,64 max.



Basic profiles of shaft

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Hub profile

Shaft profile

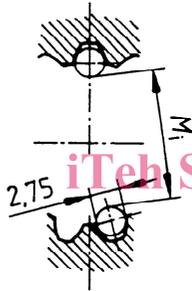
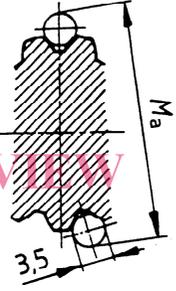
Pressure angle $\alpha = 30^\circ$; number of teeth $z = 21$; module $m = 1,5875$ (diametral pitch 16)

- 1) Size of chamfer to be chosen by the manufacturer.
- 2) Form diameter.
- 3) Only for tooth-based engaging system.

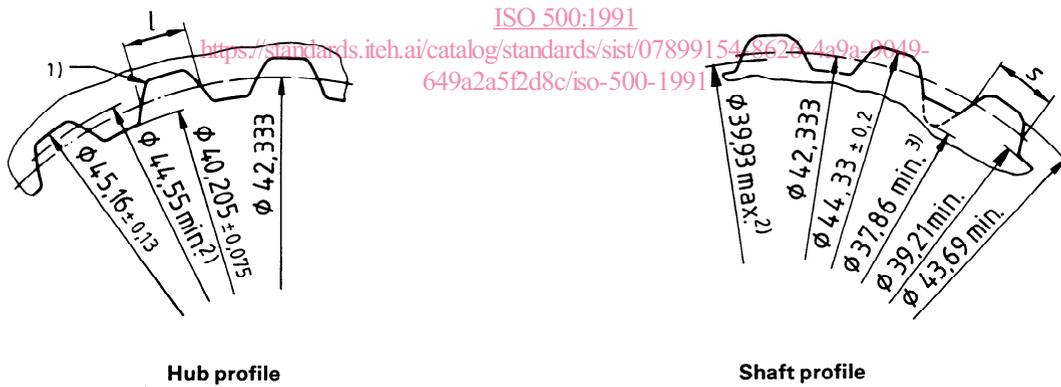
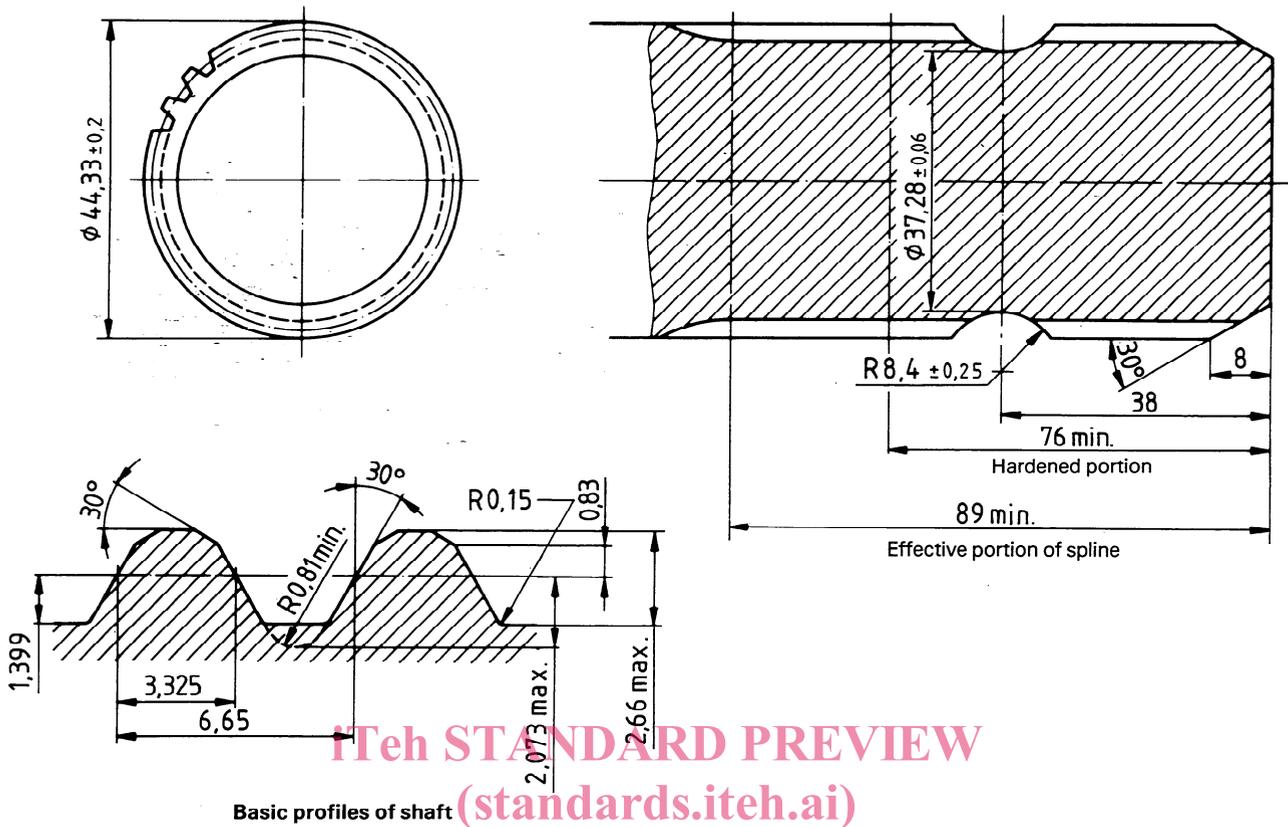
Figure 2 — PTO, type 2

Table 3 — PTO, type 2, tolerances and change factors for splines

Dimensions in millimetres

PTO type 2	Hub		Shaft	
Nominal dimension	/		s	
	2,494		2,494	
Test dimension	Individually measured	2,565 2,520	Individually measured	2,369 2,306
	With appropriate "GO" plug gauge	2,494 min.	With appropriate "GO" ring gauge	2,406 max.
Nominal dimension	Dimension between pins, M_i		Dimension over pins, M_a	
	29,240		39,182	
Change factor ¹⁾	1,936		1,473	
Test dimension		29,38 29,29 ISO 500:1991		39,00 38,90
1) Change factors are taken from ANSI B92.1, Involute splines and inspection, 9a-9049-649a2a5f2d8c/iso 500:1991				

Dimensions in millimetres



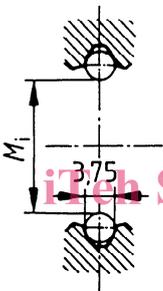
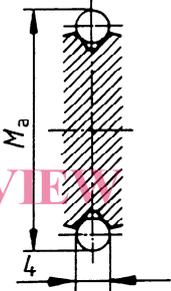
Pressure angle $\alpha = 30^\circ$; number of teeth $z = 20$; module $m = 2,1167$ (diametral pitch 12)

- 1) Size of chamfer to be chosen by the manufacturer.
- 2) Form diameter.
- 3) Only for tooth-based engaging system.

Figure 3 — PTO, type 3

Table 4 — PTO, type 3, tolerances and change factors for splines

Dimensions in millimetres

PTO type 3	Hub		Shaft	
Nominal dimension	/		s	
	3,325		3,325	
Test dimension	Individually measured	3,396 3,351	Individually measured	3,200 3,137
	With appropriate "GO" plug gauge	3,325 min.	With appropriate "GO" ring gauge	3,237 max.
Nominal dimension	Dimension between pins, M_1		Dimension over pins, M_a	
	36,704		48,432	
Change factor	2,016		1,544	
Test dimension		36,85 36,75		48,239 48,142

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Dimensions in millimetres

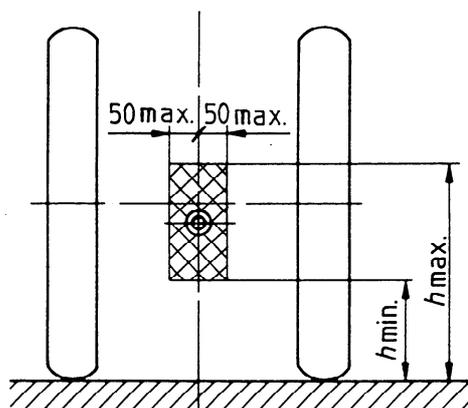


Figure 4 — Location of PTO

Table 5 — Location of PTO

Dimensions in millimetres

PTO type	$h^{1)}$	
	min.	max.
1	450 ²⁾	675
2	550	775
3	650	875

1) For purposes of compatibility, it is recommended that the upper region of the location area be used.
2) May be reduced to 350 mm on tractors with a minimum track setting of 1 150 mm or less.