
INTERNATIONAL STANDARD



500

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Agricultural tractors — Power take-off and drawbar — Specification

Tracteurs agricoles — Prise de force et barre d'attelage — Spécifications

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 500 was developed by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, and was circulated to the member bodies in March 1977.

It has been approved by the member bodies of the following countries :

Australia	France	Poland
Austria	Germany, F.R.	Romania
Brazil	India	South Africa, Rep. of
Bulgaria	Iran	Spain
Canada	Korea, Dem. P. Rep. of	Sweden
Chile	Korea, Rep. of	Switzerland
Czechoslovakia	Mexico	Turkey
Denmark	New Zealand	United Kingdom
Finland	Philippines	U.S.S.R.

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Belgium
Italy
U.S.A.

This International Standard cancels and replaces ISO Recommendation R 500-1966, of which it constitutes a technical revision.

Agricultural tractors – Power take-off and drawbar – Specification

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies requirements for :

- Types 1, 2 and 3 power take-off (PTO),
- the drawbar,
- the clearance zone around the power take-off,
- guarding of the power take-off,

on agricultural tractors, complying with the tests of ISO 789/1.

2 SPECIFICATIONS FOR THE TYPES OF POWER TAKE-OFF

2.1 General

The characteristics of the three types of PTO shall be in accordance with table 1.

2.2 Manufacturing requirements

The dimensions, in millimetres, of the main PTO on agricultural tractors shall comply with figures 1, 2 and 3 and tables 2, 3 and 4 as appropriate.

2.3 Direction of rotation of PTO

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

2.4 Location of PTO and drawbar

The relationship between the location of PTO and drawbar shall comply with figure 4.

3 DRAWBAR

The drawbar shall be situated in the longitudinal mid-plane of the tractor.

NOTE – The most important dimensions are given in figure 4.

The diameter of the hole in the drawbar should be 33 mm for all three types of PTO.

The thickness of the drawbar shall be not more than 32 mm.

4 CLEARANCE ZONE AROUND THE POWER TAKE-OFF

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

5 GUARDING OF THE POWER TAKE-OFF

The master guard, as shown in figure 6, shall be supplied by the manufacturer and shall be fixed to the tractor unless an equivalent protective device ensures the same degree of protection (for example, supports of towing hook or clevis).

TABLE 1 – Characteristics of the types of PTO

Type	Nominal diameter mm	Number and type of splines	PTO rated rotational frequency* min ⁻¹	PTO maximum power at rated rotational frequency of engine kW
1	35	6 straight splines	540	48
2	35	21 } involute 20 } splines	1 000	92
3	45			185

* The rated rotational frequency of the PTO for the three types should be reached at between 80 and 90 % of the rotational frequency of the engine.

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Dimensions in millimetres

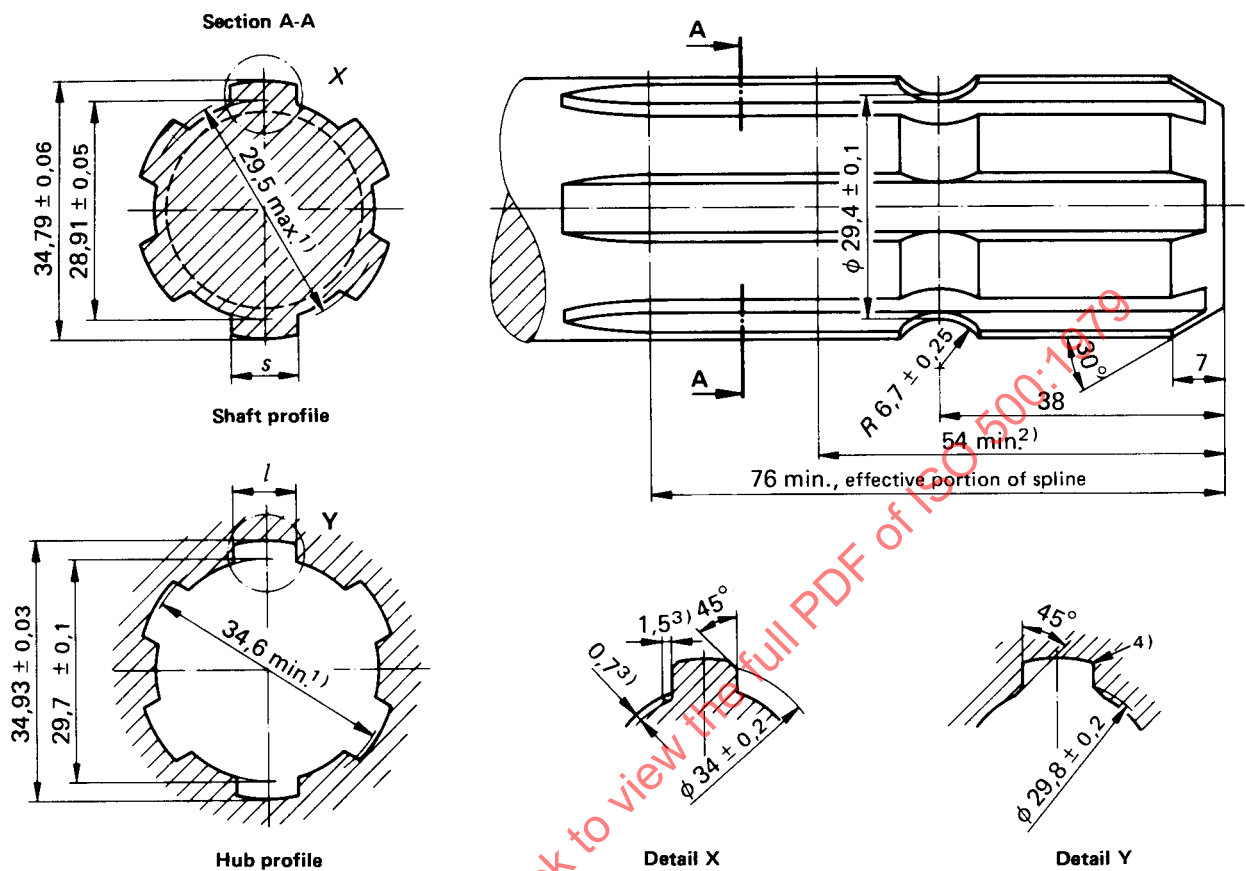


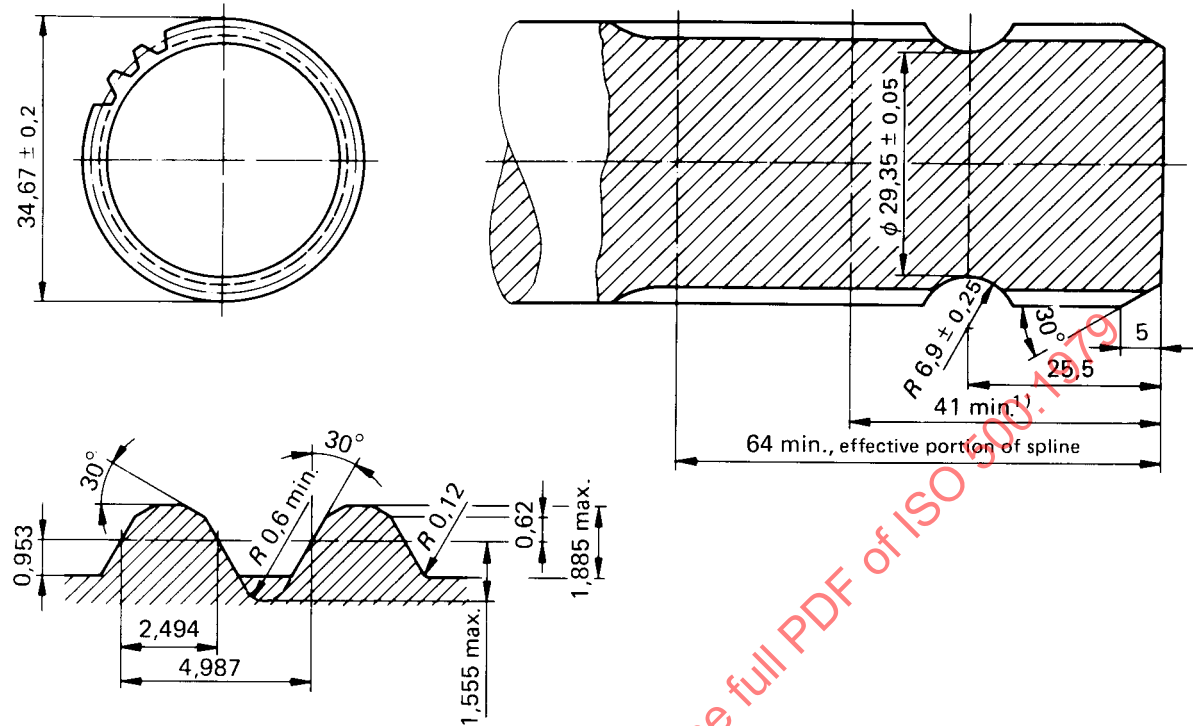
FIGURE 1 – PTO, Type 1

TABLE 2 – PTO, Type 1, tolerances for splines

Dimensions in millimetres				
PTO Type 1	Hub		Shaft	
Nominal dimension	l		s	
	8,69		8,69	
Testing dimension	Individually measured	8,74 max. 8,71 min.	Individually measured	8,60 max. 8,53 min.
	"GO" plug-gauge	8,69 min.	"GO" ring-gauge	8,64 max.

1) Form diameter. (For definition see ISO 4156; at present at the stage of draft).
2) Hardened portion : hardness 48 to 56 HRC.
3) With or without tooth relief.
4) Size of chamfer to be chosen by the manufacturer.

Dimensions en millimètres



Basic profiles of shaft



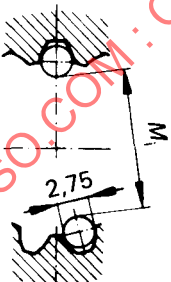
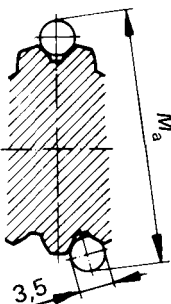
Pressure angle $\alpha = 30^\circ$; number of teeth $z = 21$; module $m = 1,5875$ (diametral pitch 16)

FIGURE 2 – PTO, Type 2

1) Hardened portion : hardness 48 to 56 HRC.
2) Form diameter.
3) Only for a tooth-based engaging system.
4) Size of chamfer to be chosen by the manufacturer.

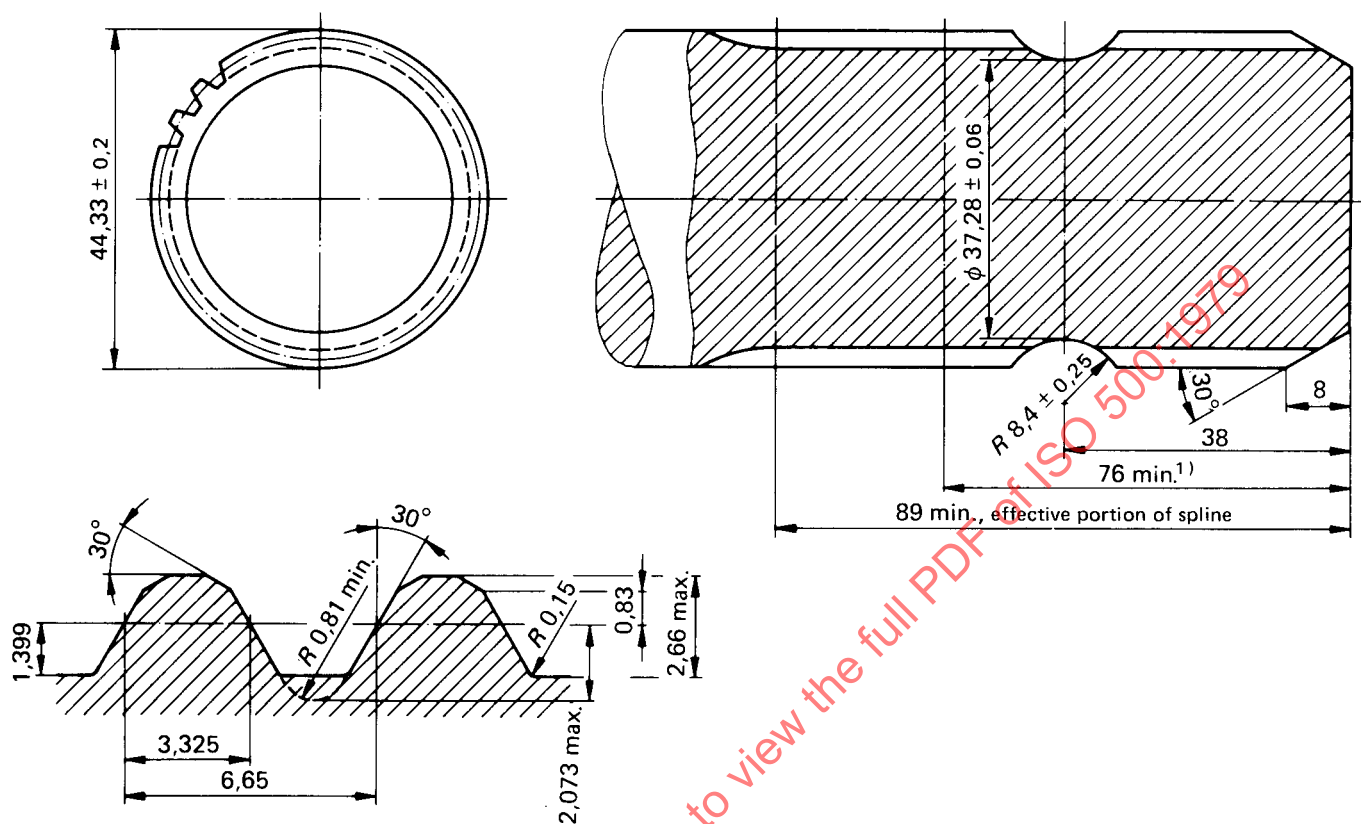
TABLE 3 – PTO, Type 2, tolerances and change factors¹⁾ for splines

Dimensions in millimetres

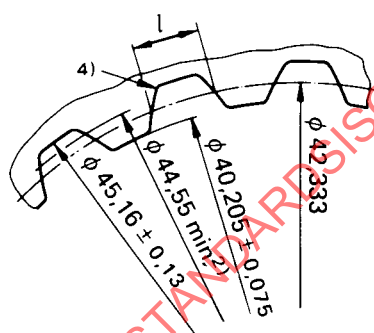
PTO Type 2	Hub		Shaft	
Nominal dimension	l		s	
	2,494		2,494	
Testing dimension	Individually measured	2,565 max. 2,520 min.	Individually measured	2,369 max. 2,306 min.
	With appropriate "GO" plug-gauge	2,494 min.	With appropriate "GO" ring-gauge	2,406 max.
Nominal dimension	Dimension between pins M_i		Dimension over pins M_a	
	29,240		39,182	
Change factor	1,936		1,473	
Testing dimension		29,38 max. 29,29 min.		39,00 max. 38,90 min.

1) For definition of change factors. See ANSI B92-1, *Involute splines and inspection*.

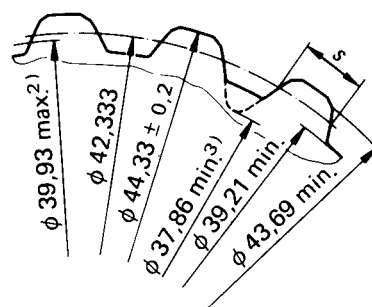
Dimensions in millimetres



Basic profile of shaft



Hub profile



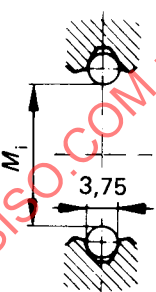
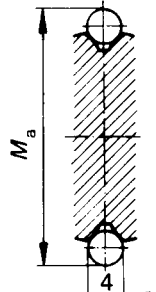
Shaft profile

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

FIGURE 3 – PTO, Type 3

- 1) Hardened portion : hardness 48 to 56 HRC.
- 2) Form diameter.
- 3) Only for tooth-based engaging system.
- 4) Size of chamfer to be chosen by the manufacturer.

TABLE 4 – PTO, Type 3, tolerances and change factors for splines

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