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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 500

POWER TAKE-OFF AND DRAWBAR FOR AGRICULTURAL TRACTORS

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 500, *Power Take-off and Drawbar for Agricultural Tractors*, was drawn up by Technical Committee ISO/TC 22, *Automobiles (Section ISO/TC 22 (T) — Agricultural Tractors)*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question by the Technical Committee began in 1952 and led, in 1961, to the adoption of a Draft ISO Recommendation.

In May 1962, this Draft ISO Recommendation (No. 503) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

Australia	Greece	Romania
Austria	Ireland	Spain
Belgium	Italy	Sweden
Chile	Japan	Switzerland
Czechoslovakia	Netherlands	United Kingdom
France	New Zealand	Yugoslavia
Germany	Portugal	

Four Member Bodies opposed the approval of the Draft:

Canada
Poland
U.S.A.
U.S.S.R.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in September 1966, to accept it as an ISO RECOMMENDATION.

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POWER TAKE-OFF AND DRAWBAR FOR AGRICULTURAL TRACTORS

1. PURPOSE

This ISO Recommendation deals with international standardization of the main power take-off on agricultural tractors. The recommended type of shaft is the splined shaft of 35 mm for which the following characteristics are specified:

— dimensions,
— speed of rotation,
— direction of rotation,
— height above the ground,
— distance to the mid-plane.

Further, this ISO Recommendation also relates to

— the clearance round the power take-off,
— location of the drawbar in relation to the power take-off,
— certain dimensional characteristics for the drawbar,
— the power take-off master guard.

2. SCOPE

The requirements recommended for 35 mm power take-off shafts apply to agricultural tractors. They do not apply to single-axle tractors, known as motor-cultivators.

The 35 mm (1 3/8 in) shaft is recommended for powers up to 45 hp * at the power take-off, at the standard power take-off speed of rotation (540 r.p.m. (revolutions per minute)).

The indications relating to the positions of the power take-off and the drawbar, and the specifications relating to the drawbar, apply to all tractors, but not to single-axle tractors, known as motor-cultivators.

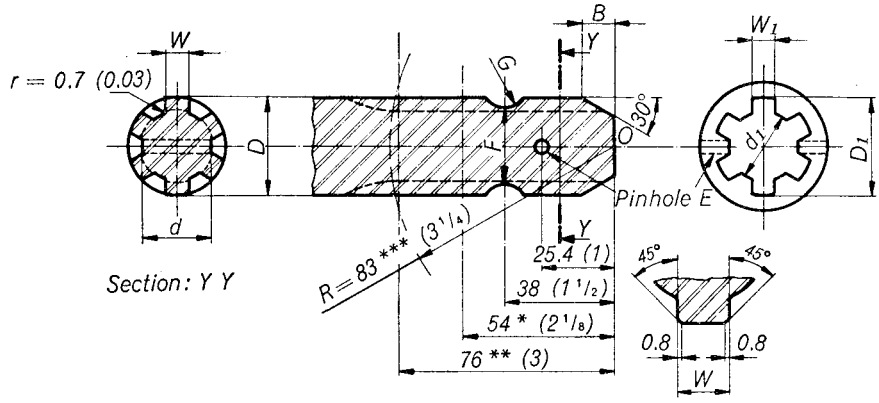
3. POWER TAKE-OFF

The recommended specifications for the main power take-off on agricultural tractors deal with dimensions, speed and direction of rotation and location.

* 1 hp = 0.746 kW.

3.1 Dimensions

Figure 1 below shows the recommended dimensions [1] for the power take-off on agricultural tractors.



Dimensions in millimetres (with inch equivalents)

Enlarged view of spline

General dimensions					Spline on shaft				Spline on hub			
			mm	in			mm	in			mm	in
	Nominal diameter		35****	1.380	D	max.	34.87	1.373	D_1	max.	34.93	1.375
E	Pinhole diameter (shaft and hub)		8.3	0.327		min.	34.82	1.366		min.	34.90	1.374
	Diameter of corresponding pin		7.9	0.311	d	max.	28.14	1.108	d_1	max.	29.72	1.170
B	Chamfer length		7	0.275		min.	27.89	1.098		min.	29.67	1.168
G	Side radius		6.7	0.264								
F	Groove bottom diameter	max.	29.5	1.160	W	max.	8.64	0.340	W_1	max.	8.74	0.344
		min.	29.3	1.155		min.	8.59	0.338		min.	8.69	0.342

* Quenched Rockwell C.

** Effective portion of the spline.

*** The spherical space of radius R = 83 mm should remain clear; no fixed part of the tractor should lie within this sphere of centre O. The shaft may be either grooved or drilled, or (preferably) grooved and drilled.

**** Recommended up to a power of 45 hp at the power take-off, at the standard (540 r.p.m.) power take-off speed of rotation.

FIG. 1. — **Recommended dimensions for the power take-off**

3.2 Speed of rotation

Recommended speed of rotation: 540 ± 10 r.p.m. at the standard speed of the engine for drawbar work.

3.3 Direction of rotation

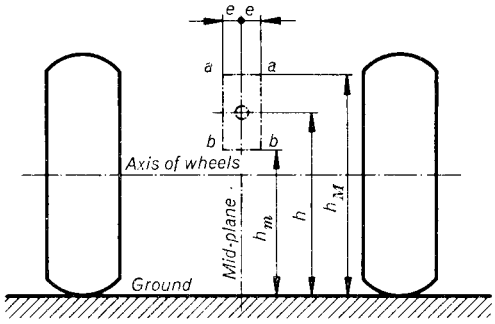
For the main power take-off, situated at the back of the tractor, the direction of rotation should be clockwise for an observer situated behind the tractor and looking in the tractor's direction of travel.

(1) These dimensions often are a conversion, into metric units, rounded to two decimal places, of the dimensions in the American SAE/ASAE S 203.2 Standard, on which this ISO Recommendation was based.

3.4 Location

(a) Height of the axis above the ground: 575 $^{+\ 100}_{-\ 75}$ mm

(b) Distance to the mid-plane (vertical longitudinal plane equidistant from the wheels): the axis of the power take-off should not be more than 50 mm from this plane. It should therefore lie within the rectangle *a a b b* (see Fig. 2).



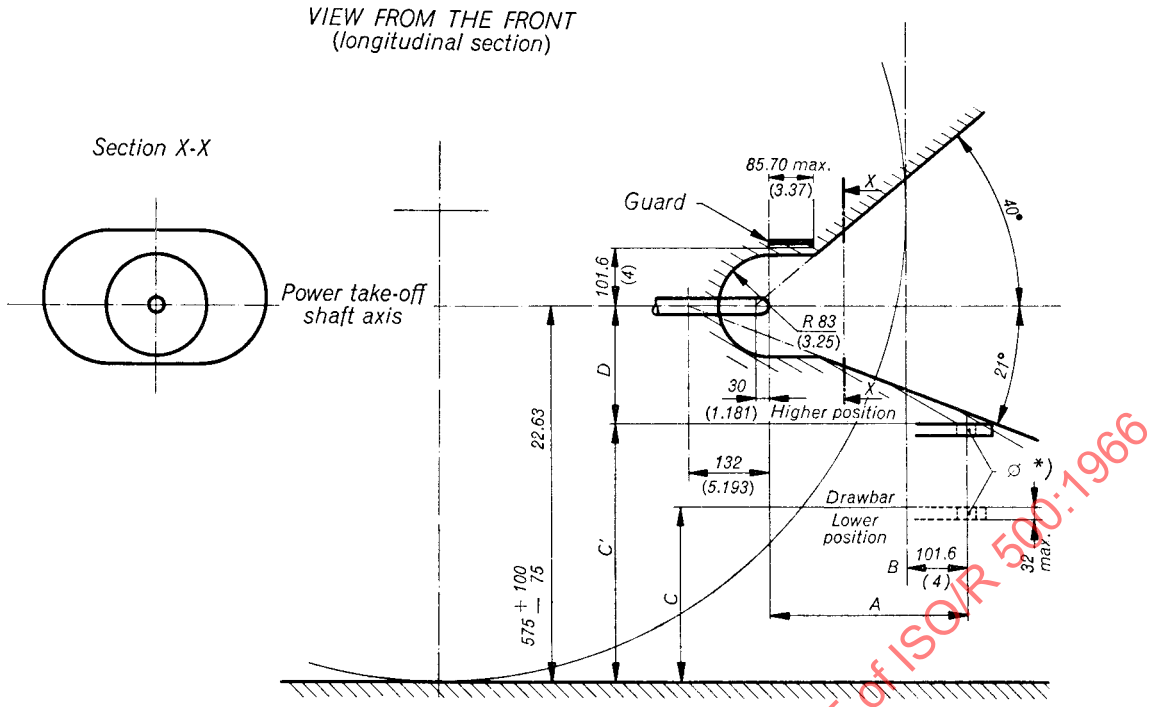
		mm
h_M	Maximum height	675
h	Recommended height	575
h_m	Minimum height	500
e	Tolerance to right and left of vertical mid-plane of tractor	50

FIG. 2. — **Location of power take-off**

4. CLEARANCE ROUND THE POWER TAKE-OFF LOCATION OF THE DRAWBAR IN RELATION TO THE POWER TAKE-OFF

The clearance round the power take-off is defined by Figure 3 overleaf which also shows the dimensions determining the relative positions of the power take-off and the drawbar. These dimensions apply to oscillating drawbars as well as to fixed drawbars.

		mm	in
A	Horizontal distance from the end of the power take-off to the axis of the last hole in the drawbar	355 ± 10	14 ± 0.4
B	Horizontal distance from the last hole in the drawbar to the vertical plane tangent to the periphery of the rear tyres .	101.6	4
—	The hitch point should be directly in line with the axis of the power take-off shaft and provision should be made on the tractor for locking the drawbar in this position.		
C	Maximum height above the ground of the upper surface of the drawbar in its low position	275	10.82
C'	Minimum height above the ground of the upper surface of the drawbar in its high position	425	16.73
D	Vertical distance from the power take-off axis to the upper surface of the drawbar. As the power take-off position is fixed for a given tractor, the drawbar—in order not to encroach on the required clearance round the power take-off—should be adjustable so that in one of its positions the distance *D* is at least .	203	8



Vertical section through clearance volume at any position on angle boundary lines (for information)

Dimensions in millimetres (with inch equivalents)

(*) ⌀ = *22 up to 45 hp*
⌀ = *33 over*

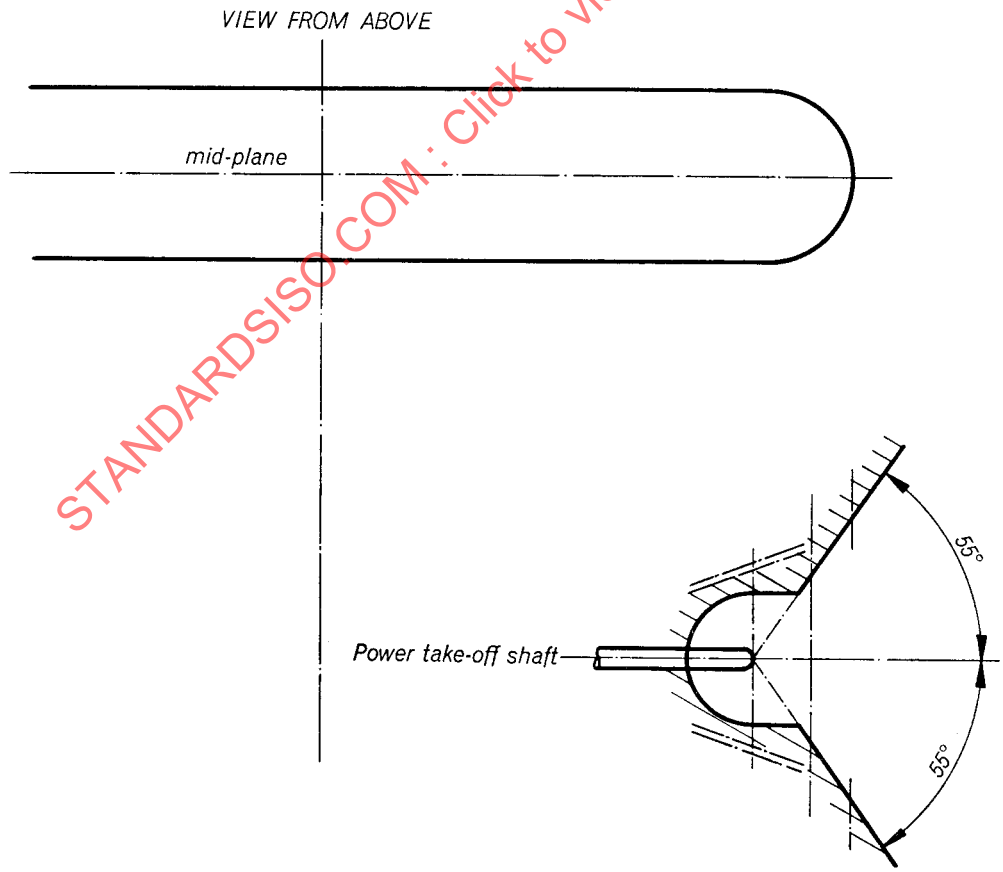


FIG. 3. — Clearance round the power take-off shaft