Rear Power Take-Off for Agricultural Tractors—SAE J1170

SAE Standard
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REAR POWER TAKE-OFF FOR AGRICULTURAL TRACTORS—SAE J1170

SAE Standard

Report of Tractor Technical Committee approved December 1976. Conforms to a corresponding American Society of Agricultural Engineers Standard. Conforms to a report of the Farm and Industrial Equipment Institute. (This document incorporates information formerly contained in J718d and J719d.) Editorial change May 1977.

1. Purpose and Scope

1.1 This standard establishes the specifications and dimensions that are essential in order that 540 r/min and 1000 r/min power take-off-driven machines may be operated with any make of tractor equipped with the corresponding power take-off drive.

1.2 This standard does not, in itself, insure adequate telescoping of the power line or safety shielding.

2. Specifications

2.1 The power take-off shaft (except belt-pulley shafts) for power take-off drives extending from the tractor to the rear shall have the dimensions shown in Figs. 1, 2, 3 and 4 and Table 1.

2.2 Dimensions associated with the drawbar and operating dimensions shall conform to Fig. 5 and Table 2.

2.3 The two rated operating speed classifications of the power take-off shaft, when under normal load, shall be 540 ± 10 r/min and 1000 ± 25 r/min. The direction of the rotation shall be clockwise when facing in the direction of forward travel.

2.4 A means to indicate when the power take-off is operating at normal speed shall be provided on tractors capable of driving the 540 r/min shaft in excess of 600 r/min and the 1000 r/min shaft in excess of 1100 r/min.

2.5 Tractors capable of driving the 540 r/min shaft in excess of 630 r/min and the 1000 r/min shaft in excess of 1170 r/min shall also include a suitable warning of operation in excess of those speeds.

2.6 Power drive line shielding and tractor master shield shall conform to SAE Standard J208—Safety for Agricultural Equipment. Tractor master shield dimensions shall conform to Fig. 6.

2.7 If removal of the tractor master shield is required for integral PTO driven implements, shielding shall be provided with the implement to provide protection as specified in SAE J208.

2.8 The tractor power take-off shaft shall be covered at all times, either by a master shield or other protective means, when not connected to a drive assembly.

2.9 The drawbar hitch point shall be directly in line with the centerline of the tractor power take-off shaft, and provisions shall be made on the tractor for locking the drawbar in this position.

2.10 The location of the tractor power take-off shaft shall be within the limits of 25.4 mm (1 in) to the right or left of the centerline of the tractor, tractor centerline being the recommended location.

2.11 The tractor drawbar when swinging through a 1.57 rad (90 deg) turn right or left, shall clear an implement clevis with the following dimensions:

2.11.1 35 mm (1 3/8 in) power shaft: 76 mm (3.0 in) vertical opening, and 76 mm (3.0 in) throat depth from hitch pin center.

2.11.2 45 mm (1 3/4 in) power shaft: 102 mm (4.0 in) vertical opening, and 102 mm (4.0 in) throat depth from hitch pin center.

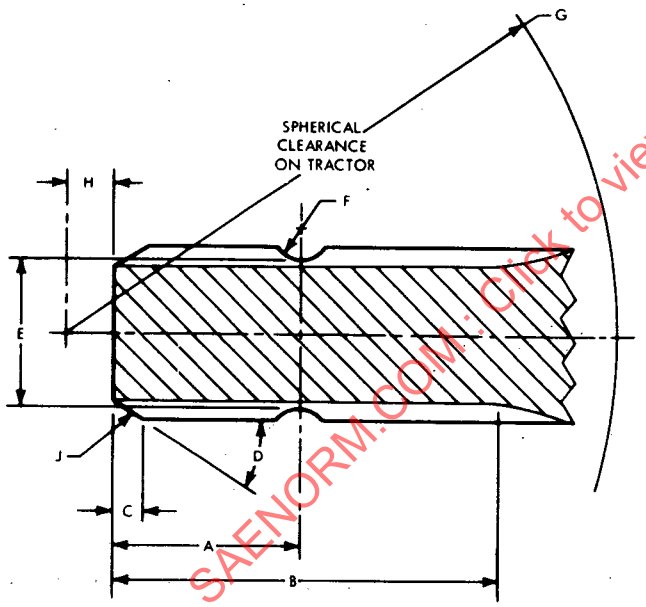


FIG. 1—POWER TAKE-OFF SHAFT (SEE TABLE 1)

The circumferential groove is provided for a locking means in the implement hub.

Effective spline length, B, to be heat treated for surface durability (within Rockwell C 48-56).

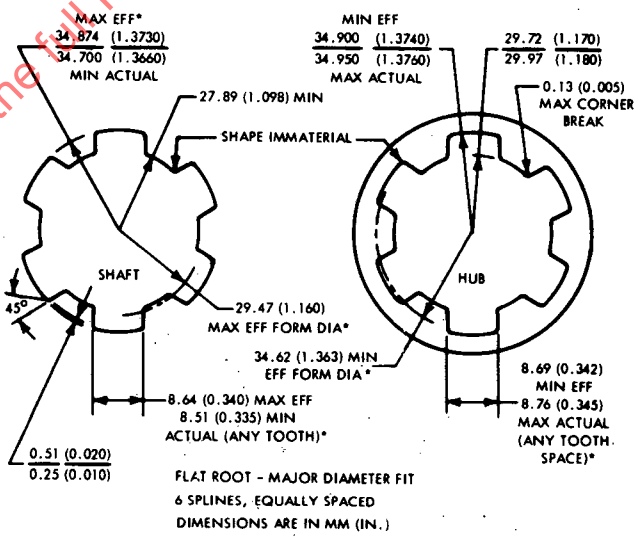
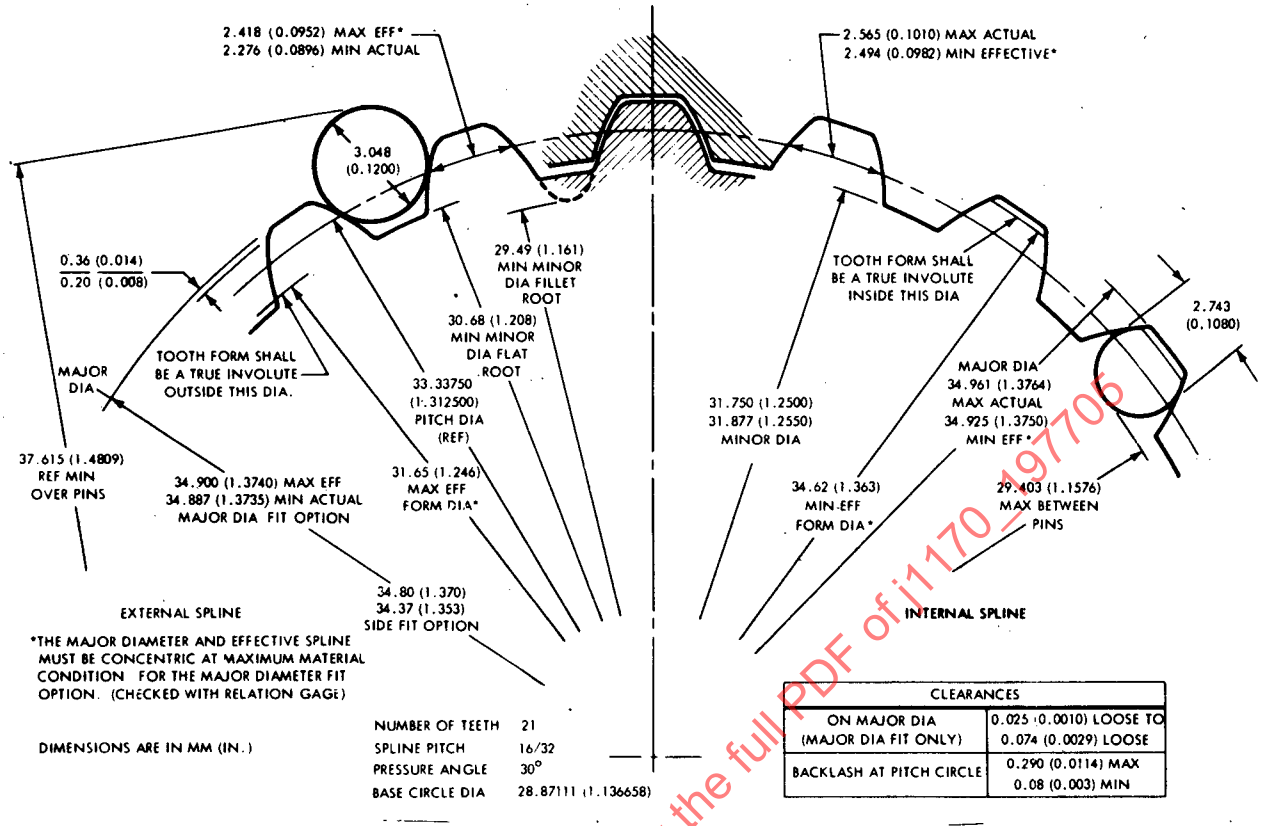
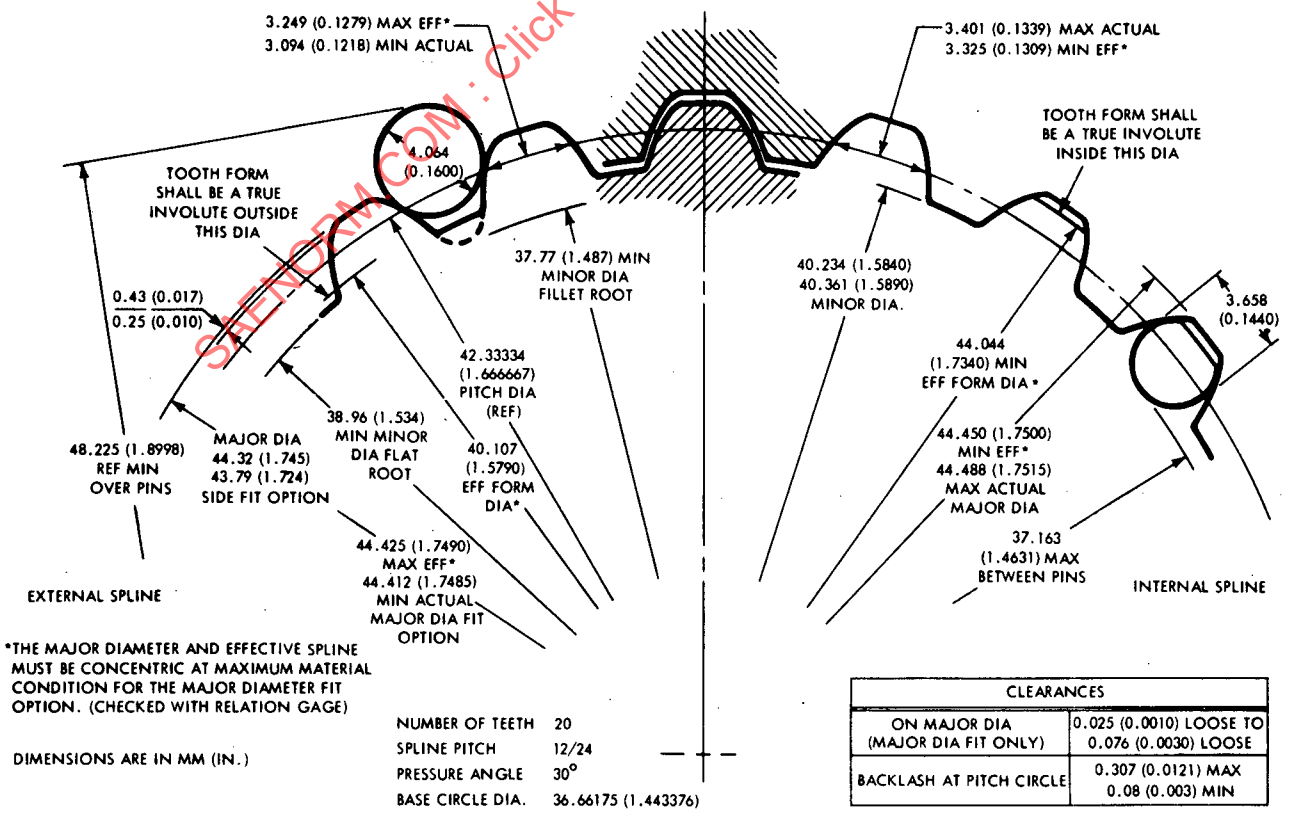


FIG. 2—540 R/MIN POWER TAKE OFF (35 mm (1 3/8 in) diameter straight side spline dimensions)



CLEARANCES	
ON MAJOR DIA (MAJOR DIA FIT ONLY)	0.025 (0.0010) LOOSE TO 0.074 (0.0029) LOOSE
BACKLASH AT PITCH CIRCLE	0.290 (0.0114) MAX 0.08 (0.003) MIN

FIG. 3–1000 R/MIN POWER TAKE-OFF (35 mm (1 3/8 in) involute spline dimensions)



CLEARANCES	
ON MAJOR DIA (MAJOR DIA FIT ONLY)	0.025 (0.0010) LOOSE TO 0.076 (0.0030) LOOSE
BACKLASH AT PITCH CIRCLE	0.307 (0.0121) MAX 0.08 (0.003) MIN

FIG. 4–1000 R/MIN POWER TAKE-OFF (45 mm (1 3/4 in) involute spline dimensions)

TABLE 1—POWER TAKE-OFF SHAFT DIMENSIONS* (SEE FIG. 1)

		35 mm (1 3/8 in.) Dia. 540 RPM	35 mm (1 3/8 in.) Dia. 1000 RPM	45 mm (1 3/4 in.) Dia. 1000 RPM
A	Groove to end of shaft	38.1 (1.50)	25.4 (1.00)	38.1 (1.50)
B	Effective spline length with relation gage, min	76.2 (3.00)	63.5 (2.50)	88.9 (3.50)
C	Chamfer	7.1 (0.28)	4.8 (0.19)	7.6 (0.30)
D	Chamfer angle	0.5 rad (30°)	0.5 rad (30°)	0.5 rad (30°)
E	ID of groove	29.46 (1.160) 29.26 (1.152)	29.46 (1.160) 29.26 (1.152)	37.34 (1.470) 37.13 (1.462)
F	Radius of groove	6.86 ± 0.25 (0.270 ± 0.010)	6.86 ± 0.25 (0.270 ± 0.010)	8.38 ± 0.25 (0.330 ± 0.010)
G	Spherical clearance radius on tractor, min	82.6 (3.25)	82.6 (3.25)	101.6 (4.00)
H	Location of center of clearance radius	0	12.7 (0.50)	0
J	Break sharp corner or chamfer	Yes	Optional	Optional

*Dimensions are in mm (in.) except where indicated otherwise.

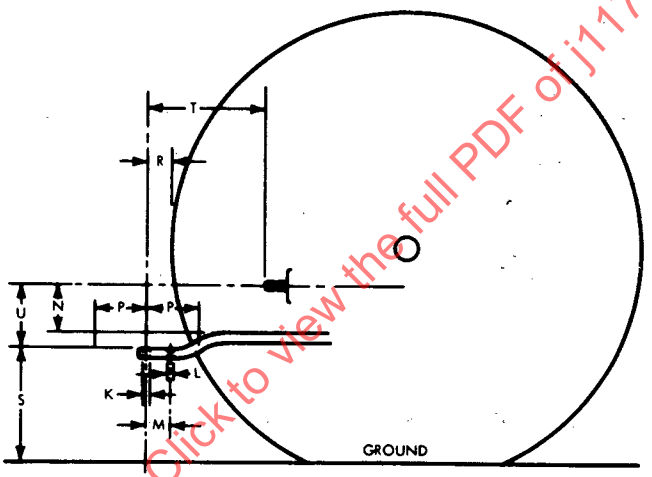


FIG. 5—TRACTOR POWER TAKE-OFF AND DRAWBAR (SEE TABLE 2)

TABLE 2—DIMENSIONS ASSOCIATED WITH DRAWBAR AND POWER TAKE-OFF* (SEE FIG. 5)

			35 mm (1 3/8 in.) Dia. 540 RPM	35 mm (1 3/8 in.) Dia. 1000 RPM	45 mm (1 3/4 in.) Dia. 1000 RPM
K	Hitch pin hole dia., min		20.6 (0.81)	20.6 (0.81)	33.3 (1.31)
L	Auxiliary hole dia.		17.3 (0.68)	17.3 (0.68)	17.3 (0.68) min
M	Auxiliary hole spacing		102 (4.0)	102 (4.0)	102 (4.0)
N	Hitch pin and clevis clearance plane below PTO shaft centerline, min		122 (4.8)	122 (4.8)	165 (6.5)
P	Hitch pin and clevis clearance plane from hitch pin centerline, min		203 (8.0)	203 (8.0)	203 (8.0)
R	†Horizontal distance from hitch pin hole to tire:				
	OD	Preferred	25 (1.0) to 127 (5.0)	25 (1.0) to 127 (5.0)	25 (1.0) to 127 (5.0)
		Max	-25 (-1.0) to 127 (5.0)	-25 (-1.0) to 127 (5.0)	-25 (-1.0) to 127 (5.0)
S	Height of drawbar with popular sized tire:				
		Preferred	381 (15.0)	381 (15.0)	483 (19.0)
		Min	330 (13.0)	330 (13.0)	432 (17.0)
		Max	432 (17.0)	432 (17.0)	533 (21.0)
T	End of PTO shaft to hitch pin hole		356 (14.0)	406 (16.0)	500.8 (20.0)
U	Top drawbar to PTO centerline:				
		Preferred	203 (8.0)	203 (8.0)	229 (9.0)
		Min	152 (6.0)	152 (6.0)	203 (8.0)
		Max	305 (12.0)	305 (12.0)	254 (10.0)

*Dimensions are in mm (in.).
†Largest code R1 tire specified for use by the tractor manufacturer.