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V-Belt and V-Ribbed Belt Drives for Agricultural Machines

American Society of
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Adopted by ASAE June 1950; revised 1960, 1962; revision proposed by a joint committee representing the Rubber Manufacturers Association and the Farm and Industrial Equipment Institute; approved by the ASAE Power and Machinery Division Technical Committee December 1968; reaffirmed December 1973, December 1978, December 1983; revised May 1986; revised editorially February 1987, September 1988; reaffirmed December 1990, December 1995, December 1996; revised editorially March 1998; revised July 1998; reaffirmed February 2003, February 2008; revised September 2015, July 2017.

Keywords: Belt, V-belt

1 Purpose

The purpose of this Standard is to provide sufficient technical data for the uniform physical application of belt drives to farm machines and mobile industrial equipment. Use of this Standard will contribute to the design of simple and economical drives.

2 Scope

2.1 This Standard establishes acceptable manufacturing tolerances, methods of measuring, and proper application for drives using V-belts or V-ribbed belts. They may be used individually or in matched sets.

2.2 This Standard is unique to agricultural belt drives and should be used in lieu of standards for industrial drives published by the Association for Rubber Product Manufacturers.

2.3 This Standard does not specify the load-life characteristics of belts.

2.4 This Standard does not include belts for automotive accessory drives, flat conveyor belting, flat power transmission belts, or synchronous belts.

2.5 The term belt(s) used throughout this Standard means V-belt(s) and V-ribbed belt(s).

2.6 In the interest of international standardization, metric-SI units, consistent with ISO 80000-1:2009, Quantities and units — Part 1: General, are included in Tables 1a through 15a.

3 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies unless noted. For undated references, the latest approved edition of the referenced document (including any amendments) applies.

ANSI/ASME B46.1-2009, Surface Texture (Surface Roughness, Waviness, and Lay)

ISO 80000-1:2009, Quantities and units — Part 1: General

ARPM IP-20, Specification for Drives Using Classical V-Belts and Sheaves

ARPM IP-21, 01, Specifications for Drives Using Double-V (Hexagonal) Belts (Joint ARPM/MPTA/RAC)

ARPM IP-22, Specifications for Drives Using Narrow V-Belts and Sheaves

ARPM IP-26, Specifications for Drives Using V-ribbed Belts and Pulleys — Part 1: Specifications in Inch-pounds Dimensions: H, J, K, L, and M Cross Sections; Part 2: Specifications in Metric (SI) Dimensions: PH, PJ, PK, PL, and PM Cross Sections

MPTA Standard B4, Standard Surface Finish for Transmission Pulleys (B4c-2008R 2013)

4 Definitions

4.1 effective width of V-belt groove: A groove width characterizing the groove profile. It is a defined value not subject to tolerance and is usually located at the outermost extremities of the straight side walls of the groove depending on manufacturer's internal belt construction. Such internal construction shall be noted. For all V-belt measuring pulleys and for most machined-type pulleys, it coincides with the actual top width of the groove within reasonable tolerances.

4.2 effective diameter of V-belt pulley: The diameter of the pulley where the centered effective width intersects the pulley groove, parallel to the pulley's rotational centerline. (Formerly designated effective outside diameter.)

4.3 effective diameter of V-ribbed pulley: The outside diameter of the pulley at a defined value at the specified pulley groove dimensions (without tolerances).

4.4 effective length: The length of a line circumscribing a belt at the level of the effective diameter of the measuring pulleys with the belt at a prescribed tension.

4.5 pitch width: The width of the belt where no longitudinal length change occurs as the belt bends or straightens, typically at the tensile cord depth (i.e. pitch line)

4.6 pitch width of groove: That width of the pulley groove which has the same dimension as the pitch width of the belt used with this pulley.

4.7 pitch diameter of pulley: The diameter of the pulley at the pitch width of pulley groove.

4.8 speed ratio and belt speed: Speed ratio is the ratio of the pitch diameter of the pulleys; generally expressed as a number equal to or greater than one (1:1). Belt speed is the linear speed of the belt calculated using the pitch diameter of the driver pulley.

4.9 installation allowance: A design length factor permitting the unforced installation of a belt (see Tables 12 through 15a).

4.10 take-up allowance: A design length factor to permit sufficient tensioning over the life of the drive (see Tables 12 through 15a).

4.11 measuring pulleys: Pulleys used for determining the effective length of a belt (see Tables 5 through 7 for dimensions).

4.12 "d" center distance: The center distance between measuring pulleys used to determine the effective length of a belt under prescribed load (see clause 7.1 and Figure 3 for procedure).

4.13 clutching allowance: A design length factor to facilitate the belt drive systems operation as a clutch (see clause 9.5).

4.14 belt Ride: The radial dimension which the belt top contour exceeds the inspection pulley diameter. See Figures 4, 5, and 6.