

ANSI/ASABE AD5673-1:2005 SEP2017

**Agricultural tractors and machinery — Power take-off drive shafts and power-input connection —  
Part 1: General manufacturing and safety requirements**



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# **Agricultural tractors and machinery — Power take-off driveshafts and power-input connection — Part 1: General manufacturing and safety requirements**

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*This standard was reviewed and approved for adoption by the ASABE Power and Machinery Tractors and Tractor Implement Interface/PTO Technical committees, and has been formally approved. Adopted and approved as an American National Standard September 2014, revised September 2017.*

**Keywords:** Definitions, Guarding, Manuals, Power take-off, Safety, Safety signs, Shielding, Transport

## **0 Foreword**

**0.1** ANSI/ASABE AD5673-1:2005 SEP2017, Agricultural tractors and machinery — Power take-off drive shafts and power-input connection — Part 1: General manufacturing and safety requirements, is an adoption with deviations of the identically titled ISO 5673-1:2005, Agricultural tractors and machinery — Power take-off drive shafts and power-input connection — Part 1: General manufacturing and safety requirements. Deviations noted in the following Foreword sections pertain to those provisions where harmonization could not be achieved between ASABE and the International Standard.

**Deviations from the subsequently printed international standard are noted with underscore (addition) or strikethrough (deletions) text. Deviations from the international standard figures and equations are clearly marked.**

**0.2** ANSI/ASABE AD5673-1:2005 SEP2017 specifies the power take-off (PTO) drive shafts of a tractor or self-propelled machine used in agriculture and the power-input connection (PIC) of its implement, establishing a method for determining PTO static and dynamic torsional strength while giving manufacturing and safety requirements. It is applicable only to those PTO drive shafts and guards mechanically linked to the shaft by at least two bearings. It is not applicable to PTO drive shafts guarded by location or to the mechanical characteristics of overrun devices and torque limiters, nor are environmental aspects considered; neither is it applicable to PTO drive shafts and their guards manufactured before the date of its publication.

**0.3** Four normative references are listed in ISO 5673-1:2005. The responsible ASABE committee has reviewed these references and approved the following deviations:

**0.3.1** Add reference ANSI/ASABE AD500-1:2014 FEB2015, Agricultural tractors — Rear-mounted power take-off types 1, 2, 3 and 4 — Part 1: General specifications, safety requirements, dimensions for master shield and clearance zone.

**0.3.2** Please note that Normative Reference ISO 500-3:2004, Agricultural tractors — Rear-mounted power take-off types 1, 2 and 3 — Part 3: Main PTO dimensions and spline dimensions, location of PTO, has been identically adopted by ASABE. ASABE adoption number is ASABE/ISO 500-3:2014 FEB2015, Agricultural tractors — Rear-mounted power take-off types 1, 2, 3 and 4 — Part 3: Main PTO dimensions and spline dimensions, location of PTO.

**0.3.3** Replace ISO 5674:2004, Tractors and machinery for agriculture and forestry — Guards for power take-off (PTO) drive-shafts — Strength and wear tests and acceptance criteria, with ANSI/ASABE AD5674:2004 SEP2015, Tractors and machinery for agricultural and forestry — Guards for power take-off (PTO) drive shafts — Strength and wear tests and acceptance criteria. Any reference to ISO 5674:2004 in the printed portion of ISO 5673-1:2005 shall be replaced by ANSI/ASABE AD5674:2004 SEP2015.

**0.3.4** Replace ISO 11684:1995, Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Safety signs and hazard pictorials — General principles, with ANSI/ASABE AD11684:1995 APR2011 (R2016ED), Tractors, machinery for agricultural and forestry, powered lawn and garden equipment — Safety signs and hazard pictorials — General principles. Any reference to ISO 11684:1995 in the printed portion of ISO 5673-1:2005 shall be replaced by ANSI/ASABE AD11684:1995 APR2011 (R2016ED).

**0.3.5** Add reference ANSI/ASABE S604.1 SEP2014, Safety for Power Take-off (PTO), PTO Drive Shafts, and Power Input Connection (PIC) for Agricultural Field Equipment.

**0.4** This standard has been approved as an American National standard by ANSI (American National Standards Institute). The original content of ISO 5673-1, Agricultural tractors and machinery — Power take-off drive shafts and power-input connection — Part 1: General manufacturing and safety requirements, was based on ANSI/SAE S318 and ANSI/ASABE S604.

**0.5** This standard deviates from ISO 5673-1:2005 as follows:

**0.5.1** See section 0.3 for normative reference deviations.

**0.5.2** Terms and Definitions changes:

**0.5.2.1** In 3.7, overrun device, replace “...tractor towards the implement...” with “...tractor to the implement...”

**0.5.2.2** In 3.8, torque limiter, replace “...a prefixed value” with “...a predetermined value.”

**0.5.2.3** In 3.9, replace the term “non-rotating PTO drive shaft guard” with “PTO drive shaft guard” and replace the definition with the following:

protective device designed to reasonably minimize the possibility of inadvertent contact with the PTO drive shaft

**0.5.2.4** In 3.10, PIC [SPTO] [SPIC] guard, replace the definition with the following:

guard, fixed on the implement, which encloses the PIC, SPTO and SPIC on all sides in conjunction with the PTO [SPTO] drive shaft guard

**0.5.2.5** In 3.11, restraining system, replace the definition with the following:

if provided, a member(s) which provides for a non-rotating PTO drive shaft guard when the PTO drive shaft rotates

**0.5.2.6** Remove Term 3.12 rotating PTO drive shaft guard and the definition.

**0.5.2.7** Renumber remaining definitions.

**0.5.3** Make the following Manufacturing Requirements changes:

**0.5.3.1** Replace Table 1 – Drive shaft telescopic thrust forces with the following:

**Table 1 – Drive shaft telescopic thrust forces**

Drive shaft power kW	PTO type <sup>a</sup>	Max. static thrust force in both directions (pull and push) kN
< 65	1 + 2	± 13
65 to 110	1	± 14
65 to 130	2	± 14
< 300	3	± 20
< 450	4	± 24

<sup>a</sup> See ANSI/ASABE AD500-1:2014 FEB2015.

**0.5.3.2** In section 4.6.1, Lubrication access, end the sentence after the word “manufacturer”:

Where lubricating applications are necessary, if the universal joints, the bearings between the shaft and guard and the telescopic members are provided with lubricating nipples, these shall be easily lubricated, e.g. by direct access to all the nipples, or by moving parts of the guard, provided that clear instructions are given by the manufacturer.

**0.5.4** Make the following Safety Requirements changes:

**0.5.4.1** In section 5.1, General Requirements, replace third and fourth paragraphs with the following:

If there is an accessory, e.g., a torque limiter and/or an overrun device, on the primary PTO drive shaft, it can be positioned either on the PIC side of the primary PTO drive shaft (see Figures 3 and 4) or on the tractor or self-propelled machine PTO side, provided that the guarding overlaps are no less than those specified in sections 5.2 and 5.3. A marking on the primary PTO drive shaft guard shall indicate the end of the primary PTO drive shaft that is to be fitted to the tractor or self-propelled machine (see Figure 12).

**0.5.4.2** In section 5.1, General Requirements, remove the sixth and seventh paragraphs.

**0.5.4.3** In section 5.1, General Requirements, paragraph 8, sentence 2, replace “....not to be the device used to...” with “...not be the restraining system used to...”

**0.5.4.4** In section 5.2.1, Universal joint, paragraph 2, replace “...PTO draft shaft.” with “...PTO drive shaft”.

**0.5.4.5** In Table 2, Dimension c for primary PTO drive shaft, add PTO Type 4 with max. c value of 90.

**0.5.4.6** In section 5.5.2, Restraining system, replace “Non-rotating...” with “Where required by regional or national legislation...”

**0.5.4.7** In section 5.6, Locking device on PTO yoke, replace paragraph with the following:

For the locking device on the PTO yoke, see ANSI/ASABE S604.1 SEP2014.

**0.5.5** Make the following Information for Use changes:

**0.5.5.1** In section 6.1, Instruction handbook, point e: 1) insert “if provided,” and 2) replace “member(s)” with “system”:

e) that the PTO drive shaft shall not be used without a guard or with a damaged guard or if provided, without using the restraining system correctly;

**0.5.5.2** In section 6.1, Instruction handbook, point f: 1) insert “if provided,”; 2) replace “member(s)” with “system”; and replace “member” with “system”:

f) the need to use a support for the PTO drive shaft, when it is uncoupled from the tractor PTO or self-propelled machine PTO, which is different from the restraining system if provided, and instruction not to use the restraining system for this purpose;

**0.5.5.3** In section 6.1, Instruction handbook, point l, insert “if provided,”:

i) if provided, how to use and attach a restraining system;

**0.5.5.4** In section 6.1, Instruction handbook, replace point p with the following:

p) a warning that no device (e.g. spline adapters or extensions) shall be installed between the tractor PTO and the primary PTO drive shaft;

**0.5.5.5** In section 6.2, Marking and safety signs, replace second paragraph with:

Where needed, marking on the primary PTO drive shaft guard shall indicate the end of the primary PTO drive shaft that is to be linked to the PTO of the tractor or the self-propelled machine. An example is shown in Figure 12.

Text of ISO 5673-1:2005, Agricultural tractors and machinery — Power take-off drive shafts and power-input connection — Part 1: General manufacturing and safety requirements, with deviations noted, follows.

## 1 Scope

This part of ISO 5673 specifies the power take-off (PTO) drive shafts of a tractor or self-propelled machine used in agriculture and the power-input connection (PIC) of its implement, establishing a method for determining PTO static and dynamic torsional strength while giving manufacturing and safety requirements. It is applicable only to those PTO drive shafts and guards mechanically linked to the shaft by at least two bearings. It is not applicable to PTO drive shafts guarded by location or to the mechanical characteristics of overrun devices and torque limiters, nor are environmental aspects considered; neither is it applicable to PTO drive shafts and their guards manufactured before the date of its publication.

## 2 Normative references

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

[ANSI/ASABE AD500-1:2014 FEB2015, Agricultural tractors — Rear-mounted power take-off types 1, 2, 3 and 4 — Part 1: General specifications, safety requirements, dimensions for master shield and clearance zone](#)

ISO 500-3, Agricultural tractors — Rear mounted power take-off types 1, 2, and 3 — Part 3: Main PTO dimensions and spline dimensions, location of PTO

ISO 4254-1:2013, Agricultural machinery — Safety — Part 1: General requirements<sup>1</sup>

[ISO 5674:2004, Tractors and machinery for agriculture and forestry — Guards for power take-off \(PTO\) drive-shafts — Strength and wear tests and acceptance criteria](#)

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<sup>1</sup> To be published. (Revision of ISO 4254-1:1989)

[ANSI/ASABE AD5674:2004 SEP2015, Tractors and machinery for agriculture and forestry — Guards for power take-off \(PTO\) drive-shafts — strength and wear tests and acceptance criteria](#)

ISO 11684:1995, Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Safety signs and hazard pictorials — General principles

[ANSI/ASABE AD11684:1995 APR2011 \(R2016ED\), Tractors, machinery for agricultural and forestry, powered lawn and garden equipment — Safety signs and hazard pictorials — General principles](#)

[ANSI/ASABE S604.1 SEP2014, Safety for Power Take-off \(PTO\), PTO Drive Shafts, and Power Input Connection \(PIC\) for Agricultural Field Equipment](#)

### **3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply.

#### **3.1**

##### **power take-off (PTO) drive shaft**

assembly consisting of two joints, telescopic members and a guard which is mechanically linked to the shaft by at least two bearings used to transmit rotational power from the PTO of a tractor or self-propelled machine to an implement and/or between parts of the implement

##### **3.1.1**

##### **primary PTO drive shaft**

detachable PTO drive shaft linking the PTO of the tractor or self-propelled machine to the PIC of an implement

See Figure 1.