

International Standard



5674

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Tractors and machinery for agriculture and forestry — Guards for power take-off drive shafts — Test methods

Tracteurs et matériels pour l'agriculture et la sylviculture — Protecteurs d'arbres de transmission à cardans de prise de force — Méthodes d'essai

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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 5674 was developed by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, and was circulated to the member bodies in June 1981.

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

Belgium	Iraq	Spain
Canada	Italy	Sweden
China	Korea, Dem. P. Rep. of	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
Denmark	Netherlands	United Kingdom
Finland	New Zealand	USA
Germany, F. R.	Romania	USSR
India	South Africa, Rep. of	

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

Austria
France

Tractors and machinery for agriculture and forestry — Guards for power take-off drive shafts — Test methods

0 Introduction

This International Standard is related to world wide trade which implies re-export of PTO drive shafts to countries with extreme temperatures. For this reason a temperature range of $-35\text{ }^{\circ}\text{C}$ to $60\text{ }^{\circ}\text{C}$ has been specified.

1 Scope and field of application

This International Standard specifies laboratory test procedures for determining the robustness and durability of guards for power take-off (PTO) drive shafts.

2 References

ISO 500, *Agricultural tractors — Power take-off and drawbar — Specification.*

ISO 5673, *Agricultural tractors — Power take-off drive shafts for machines and implements.*

3 Definitions

3.1 implement drive line : The shafts, universal joints, connectors and fasteners provided with the implement to transmit rotational power from the tractor PTO to the first component on the implement, for example a gear set, pulley, sprocket or fly wheel.

3.2 shaft closed length : The distance between the centres of the journal cross-assemblies when the PTO drive shaft is fully closed.

3.3 shaft extended length : The distance between the centres of the journal cross-assemblies when the PTO drive shaft is extended to the maximum length recommended by the manufacturer.

3.4 non-rotating PTO drive shaft guard : A PTO drive shaft guard held stationary while the shaft is rotating.

3.5 rotating PTO drive shaft guard : A PTO drive shaft guard which can rotate with the shaft except when it comes into contact with some other object.

4 Test conditions

4.1 The guard, which shall be taken from the series production and within the tolerances shown on production drawings, shall be subjected to the appropriate tests detailed in 5.2 to 5.6 following the test sequence given.

The guard shall be tested in conjunction with a PTO drive shaft complying with the appropriate requirements of ISO 5673.

The same guard shall be used throughout the tests. The results obtained from a sample shall be valid for guards of shorter length.

4.2 When the guard is made of plastic material, its resistance against UV radiation (sunlight) at $60\text{ }^{\circ}\text{C}$ should be certified by the manufacturer.

4.3 Tests shall be carried out at an ambient temperature between 5 and $35\text{ }^{\circ}\text{C}$, except as specified for the freezing test (see 5.4) and impact test (see 5.5).

4.4 Where a test procedure requires the shaft to be rotated, the rotational frequency shall be that appropriate to the type of PTO, as given in ISO 500, unless otherwise specified.

The same rotational frequency shall be used for all the relevant tests, unless otherwise specified.

4.5 Where a test procedure requires the use of water, care shall be taken to ensure that it does not contain contaminants.

5 Tests

5.1 General

After each test, note and record the condition of the guard with particular reference to any fractures or detachment of components.

5.2 Axial loading test

5.2.1 With the PTO drive shaft and guard stationary, apply an axial force of 250 N between the cone and the tube in both directions. The force to be applied to the cone face of the guard.

5.2.2 With the PTO drive shaft and guard stationary, apply an axial force of 1 000 N between the tube and the PTO drive shaft in both directions.

5.2.3 Note any displacement of the guard from the shaft.

5.3 Radial loading test

5.3.1 Support the guarded PTO drive shaft by its usual end connections in a horizontal position and extend to the maximum length recommended by the manufacturer.

5.3.2 Rotate the PTO drive shaft at a frequency of 1 000 min⁻¹ and, using a smooth flat 100 mm wide wooden beam, apply a direct load of 500 N for 60 s at right angles to the shaft guard at its mid point.

NOTE — When applying the load, care should be taken to ensure that no impact load is applied.

5.3.3 Record whether or not the guard remained stationary during the 60 s period. Also, record any damage to the guard.

5.3.4 Rotate the PTO drive shaft at a frequency of 1 000 min⁻¹ and, using a smooth, flat 100 mm wide wooden beam, apply a direct load of 500 N to the cone face of the guard over the centre of the universal joint when in line with the PTO drive shaft, for 60 s at right angles to the axis of the universal joint.

NOTE — When applying the load, care should be taken to ensure that no impact load is applied.

5.3.5 Record whether any additional part of the shaft was exposed during or after the test.

5.4 Freezing test

5.4.1 Immerse the PTO drive shaft, with guard, in water (see 4.5), remove from the water and allow any water which may run off under gravity to do so.

5.4.2 Shorten the PTO drive shaft, with guard, to its minimum recommended length.

5.4.3 Lower the temperature to – 35 °C and maintain the PTO drive shaft and guard at that temperature for one hour.

5.4.4 Extend the PTO drive shaft, with guard, to its maximum length recommended by the manufacturer.

5.4.5 Record any displacement of the guard from the PTO drive shaft.

5.5 Impact test

5.5.1 Support the PTO drive shaft and guard in a horizontal position by their normal end connections and extend to the maximum length recommended by the manufacturer.

5.5.2 Lower the temperature to – 35 °C and maintain the PTO drive shaft and guard at that temperature for one hour.

5.5.3 Strike three blows on the guard, one on the cone over the centre of the universal joint when in line with the PTO drive shaft, one midway along one of the tubes and one at the mid-point of the overlap of the tubes, by dropping a steel bar, with a mass of 10 kg, in a vertical direction to the guard from a height of 1 m. The contact face shall be 50 mm diameter. A pendulum hammer is permitted as a replacement device. The pendulum should be constructed to apply the same force to the guard as would result from dropping the 10 kg from a height of 1 m.

5.5.4 Record any damage or displacement of the guard from the PTO drive shaft.

5.6 Restraining member test (where fitted)

5.6.1 Apply a force of 400 N to each fitted restraining member.

5.6.2 Record any distortion of the restraining member or opening of the fixing hooks.

6 Test report

6.1 The test report shall include the following details :

- a) details of PTO drive shaft guard;
- b) ambient temperatures, where appropriate;
- c) rotational frequency (radial loading test only);
- d) condition of the guard after each test (see 5.1);
- e) results of axial loading test (see 5.2), if applicable;
- f) results of radial loading test (see 5.3.3 and 5.3.5);
- g) results of freezing test (see 5.4.5);
- h) results of impact test (see 5.5.4);
- j) results of restraining member test (see 5.6.2), if applicable.

6.2 A typical test report is shown in the annex.

Annex

Form of test report

(see clause 6)

Report on test of power take-off shaft guard.

Brief description

Length of shaft – closed mm
 extended mm

Guard – non-rotating or rotating*

Cones

Material
 Length mm
 Maximum diameter mm

Tubes

Material
 Length mm
 Outside diameters [ISO 5674:1982](https://standards.iteh.ai/catalog/standards/sist/b4128f4f-8520-4ea0-8c77-b7c906a300d9/iso-5674-1982) mm
 Inside diameters <https://standards.iteh.ai/catalog/standards/sist/b4128f4f-8520-4ea0-8c77-b7c906a300d9/iso-5674-1982> mm

Method of location on shaft

Type of bearings

Other features

Axial loading test

Ambient temperature °C
 Did guard remain located on shaft ? Yes/No*
 If not, record details of the failure

Condition of guard

Radial loading test

Ambient temperature °C
 Rotational frequency min⁻¹
 Did guard remain stationary during the 60 s period ? Yes/No*
 Was any additional part of the shaft exposed during or after the test ? Yes/No*

* Delete non-applicable response.

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Condition of guard, including any damage to the guard

Freezing test

Did guard remain located on shaft ? Yes/No*
If not, record any displacement of the guard

Condition of guard

Impact test

Did guard remain located on shaft ? Yes/No*
If not, record any displacement of the guard

Condition of guard

Restraining member test

Ambient temperature °C

Condition of guard

Comments, if any

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