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Third edition
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Tractors and machinery for agriculture and forestry — Guards for power take-off (PTO) drive-shafts — Strength and wear tests and acceptance criteria

Tracteurs et matériels agricoles et forestiers — Protecteurs d'arbres de transmission à cardans de prise de force (p.d.f) — Essais de résistance mécanique et d'usure et critères d'acceptation

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 2, *Common tests,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 144, *Tractors and machinery for agriculture and forestry*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 5674:2004), which has been technically revised.

The main changes are as follows:

— the wording of Annex B line 8 has been clarified regarding “spectral irradiance”;

— the Type 4 Power Take-Off from ISO 500-1:2014 has been added.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document is a type C standard as stated in ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises);

— consumers (in the case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

Tractors and machinery for agriculture and forestry — Guards for power take-off (PTO) drive-shafts — Strength and wear tests and acceptance criteria

1 Scope

This document specifies tests for determining the strength and wear resistance of guards for power take-off (PTO) drive- shafts on tractors and machinery used in agriculture and forestry, and their acceptance criteria. It is intended to be used in combination with ISO 5673-1:2005.

It is applicable to the testing of PTO drive- shaft guards and their restraining means. It is not applicable to the testing of guards designed and constructed to be used as steps.

This document is not applicable to guards for power take-off drive shafts that are manufactured before the date of publication of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 500-1:2014, *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 4892-1:2016, *Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance*

ISO 4892-2:2013, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

ISO 4892-2:2013/Amd 1:2021, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps — Amendment 1: Classification of daylight filters*

ISO 5673-1:2005, *Agricultural tractors and machinery — Power take-off drive shafts and power-input connection — Part 1: General manufacturing and safety requirements*

ISO 105-A02:1993, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5673-1:2005 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
minimum length
minimum distance that can be measured along the outside of the guard when held at its closed length

Note 1 to entry: For closed length, see ISO 5673-1:2005.

3.2
maximum length
maximum distance that can be measured along the outside of the guard when held at its extended length and bent through 90°

Note 1 to entry: For extended length, see ISO 5673-1:2005.

4 General test conditions

4.1 Guard

4.1.1 The guard shall be representative of a production model and be within the tolerances specified for the guard. The results obtained from the sample can be used to validate guards of shorter or longer lengths, provided the basic design remains the same. When a guard is designed for use with several drive shaft types, a representative selection of shaft and guard combinations shall be tested.

4.1.2 If the guard is made of plastic material (or any other material susceptible to degradation by UV radiation), it shall be validated to be resistant to degradation from UV radiation under an appropriate, recognized method in accordance with Annex B.

4.1.3 During testing, all operating and maintenance instructions specified for the shaft and guard shall be complied with, except where specifically mentioned by this document.

4.1.4 The guard shall be tested in conjunction with a PTO drive shaft of between 900 mm and 1 010 mm closed length for which it is intended. The same guard shall be used throughout all the tests.

4.2 Other conditions

4.2.1 If specified in this document that the PTO drive shaft shall be rotating, its rotational frequency shall be 1 300 r/min for PTO drive shafts designed to be used for Type 4 PTO and 1 000 r/min for all other PTO drive shafts.

4.2.2 All tests shall be carried out in accordance with the schedule and in the sequence given in Annex A.

4.2.3 All tests to be carried out at ambient temperature shall be carried out at temperature between 5°C and 35°C.

5 Test equipment

5.1 General

5.1.1 Wear test equipment shall be capable of holding the PTO drive shaft and rotating it at a frequency of 1 300 r/min for PTO drive shafts designed to be used for Type 4 PTO and 1 000 r/min for all other PTO drive shafts.

The shafts and guards shall be mounted as specified for operational use and only fixed by their designated restraining device. The fixing points shall be in accordance with ISO 500-1:2014 and the equivalent machine standard unless otherwise specified for that type of shaft. The size and shape of the wear test equipment shall be such that an even test environment is maintained, e.g. heat and the dust specified in 5.2.3.

5.1.2 Strength test equipment shall allow the application of known loads at controlled temperatures and at the required frequency of rotation within the tolerances stipulated in Table 1.

5.2 Test parameters

5.2.1 Measuring accuracy

All measurements shall be within the tolerances given in Table 1 except where otherwise required by this document.

Table 1 — Measuring accuracy

	Measuring accuracy	Test tolerance
Rotational speed	±0,5 %	+5 %
Temperature	±1,0 °C	±5 %
Time	±0,2 %	+5 %
Length	±0,5 %	±2 %
Force	±1,0 %	+2 %

5.2.2 Potable and salt water

5.2.2.1 When a test requires the use of water, it shall be potable (i.e. drinking water).

5.2.2.2 When a test requires a saltwater solution, it shall be prepared by dissolving sodium chloride in water to produce a concentration of 50 g/l ± 5 g/l. It shall not contain copper and nickel, and shall not contain more than 0,1 % of sodium iodine and not more than 0,4 % of total impurities calculated for dry salt.

5.2.3 Test dust

5.2.3.1 The test dust shall consist of a mixture composed of equal parts, by mass, of organic and mineral dust.

5.2.3.2 The organic dust shall be ground lucerne with a maximum percentage of 12 % water and with a maximum particle size of 2 mm. An environment of 0,5 kg/m^3 shall be maintained.

5.2.3.3 The mineral dust shall be a simple phosphated fertilizer, and shall contain as principal elements silicophosphates of calcium having the following characteristics:

— minimum content: 9 % of P_2O_5 total (±3 %);

— other: at least 75 % of the P_2O_5 total declared, soluble in a 2 % concentration of citric acid.

See Table 2.

Table 2 — Mineral dust specifications

Mesh opening of sieve mm	Minimum fineness of grinding, after sifting %
>0,063	—
>0,125	—
>0,16	75
> 0,63	96

6 Tests

6.1 General

After each test, the condition of the guard shall be recorded, with particular reference to any fractures, permanent deformation or detachment of components which can contribute to the deterioration of the guard.

For the test sequence, see Annex A.

The PTO drive shaft guard shall be deemed to have passed the test if

— the guard has no holes or deformation which leave the shaft unprotected,

— the guard has no breakage, crack or part separation, and

— the guard freely rotates separately from the PTO drive shaft when the PTO drive shaft is rotated.

Tests for a novel guard design are provided in Annex D.

6.2 Wear test

6.2.1 For the whole test, the shaft shall be rotating and, while rotating, shall be extended to its extended length (see ISO 5673-1:2005), held for 1 min, then returned and held at its closed length (see ISO 5673-1:2005) for 4 min. This shall be repeated for the duration of the test period. See Annex A for the test sequence.

Guards shall only be fixed using the normal fixing and restraining system.

Before the start and at the end of each of the wear test cycles, the torque required for the immobilization of any part of the guard shall be measured, having first run the guard for 1 min. The torque measured shall not exceed 2,5 N·m per bearing race up to a maximum of 10 N·m per complete drive shaft.

6.2.2 At the start and at the end of the wear test, the running torque that needs to be applied to each guard tube in order to immobilize it shall be measured when the shaft is rotating at 1 300 r/min for PTO drive shafts designed to be used for Type 4 PTO and 1 000 r/min for all other PTO drive shafts.

6.2.3 For wear tests with dust, the test atmosphere shall contain 0,5 kg/m^3 of dust according to 5.2.3.

6.3 Bearing corrosion test

IMPORTANT — This test is performed only if the guard has bearings running in contact with the PTO drive shaft.

Taking the shaft with the bearing in place, but with the rest of the guard removed, and supported horizontally and stationary, salt water (see 5.2.2.2) shall be applied to all bearings for the first 5 min of every hour for 48 h, then shall be left to dry in free air (i.e. 48 cycles consisting of salt water application for 5 min of each cycle and drying in free air for the other 55 min of each cycle).

The salt water shall flow over all the metallic parts of the bearing system at some stage during the 5 min. No liquid shall be thrown off. The application of the salt water shall be carried out such that salt solution corrosion of its inner tubes is avoided.

6.4 Strength tests

6.4.1 Dynamic radial loading test at defined temperature limits

The guarded drive shaft shall be subjected to a radial loading test at ambient temperature after each complete cycle of the wear test (See Annex A and D.8).

The PTO drive shaft guard shall be deemed to have passed the test if

— the guard has no holes or deformation which leave the shaft unprotected, and

— the guard has no breakage, crack or part separation.

6.4.2 Test on guard component covering joints

The PTO drive shaft shall be rotated and, using a smooth, flat, 100 mm wide wooden beam, a direct force of 500 N shall be applied to the cone of the universal joint for 60 s, in accordance with Annex A, perpendicularly to the PTO drive shaft.

To avoid excessive vibration, the wooden beam shall be supported by a 20 mm thick rubber backing of approximately A 20 Shore hardness. When applying the load, care shall be taken to ensure that no impact load is applied.

Test over every joint.

The PTO drive shaft guard shall be deemed to have passed the test if

— the guard has no holes or deformation which leave the shaft unprotected, and

— the guard has no breakage, crack or part separation.

6.4.3 Test on tubes

The guarded PTO drive shaft shall be supported in a horizontal, straight line by its usual end connections, at its extended length.

The PTO drive shaft shall be rotated and, using a smooth, flat, 100 mm wide wooden beam, a direct load of 500 N shall be applied for 60 s perpendicularly to the shaft guard at its midpoint, in accordance with Annex A.

Whether any part of the rotating shaft was exposed during or after the test that allows a 30 mm probe to come into contact with that rotating part shall be recorded.

The PTO drive shaft guard shall be deemed to have passed the test if

— the guard has no holes or deformation which leave the shaft unprotected, and

— the guard has no breakage, crack or part separation.

6.4.4 Dynamic swivel test

The dimensions of the cone guarding the universal joints shall be such that the cone will not be damaged by contact with the master shield (see ISO 500-1:2014), when the drive shaft and guard are at the maximum allowable angle and while the shaft is rotating as specified in the instruction handbook.

If the guard cone does not come into contact with the master shield or any part of the drive shaft when the drive shaft is at the specified maximum rotating angular position, this test need not be carried out.

The following procedure shall be performed, with the PTO drive shaft rotating at 1 300 r/min for PTO drive shafts designed to be used for Type 4 PTO and 1 000 r/min for all other PTO drive shafts.

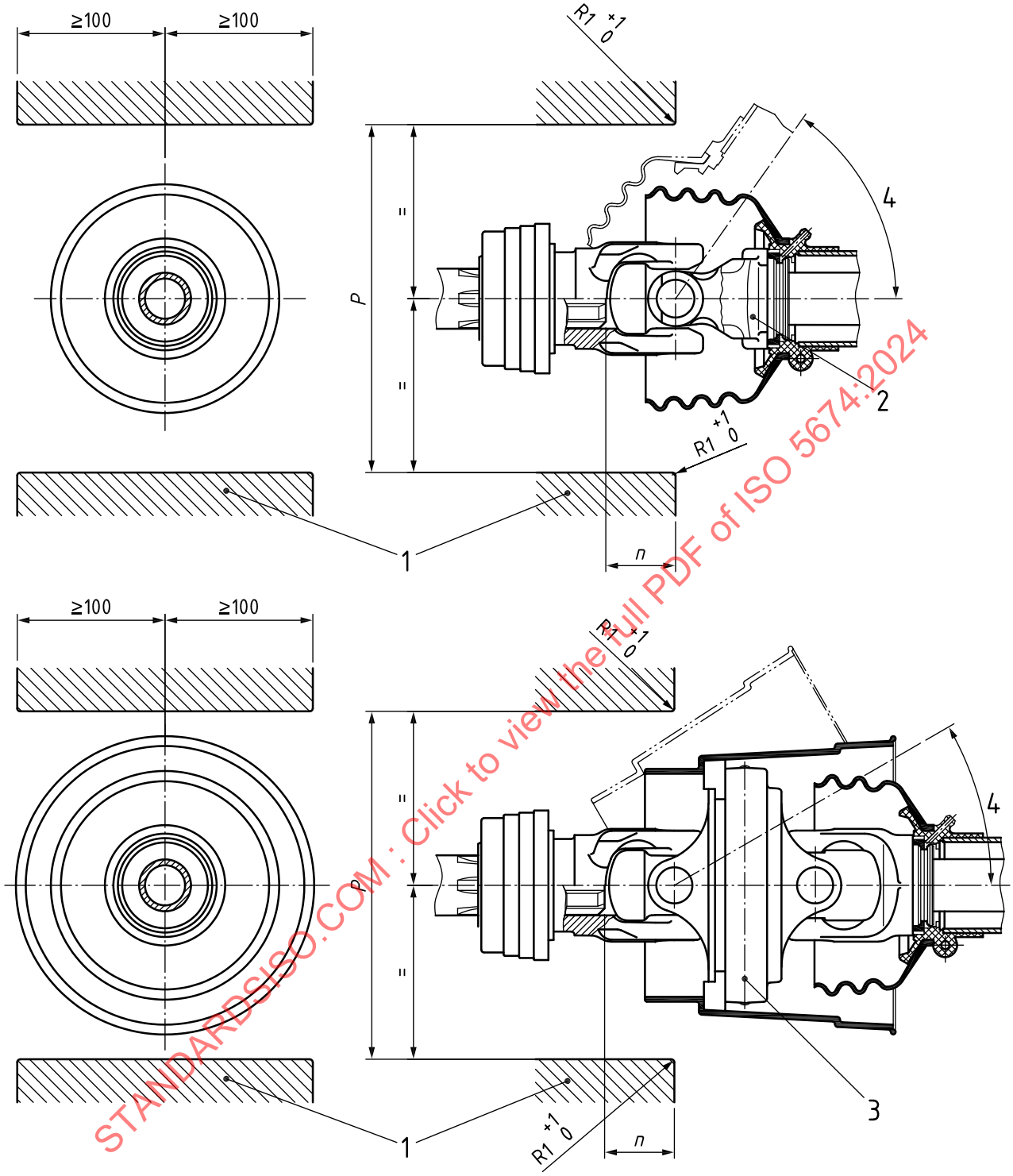
a) Test the drive shafts with a nominal torque rating of <1 000 N·m or a nominal transmitted power <57 kW at 540 r/min with the test master shield for PTOs of Types 1 and 2.

b) Test the drive shafts with a higher nominal torque rating or nominal transmitted power with the test master shield for PTOs of Types 3 and 4.

The PTO drive shaft shall be coupled to a fixture with the test master shield integrated as shown in Figure 1. The dimensions given in Table 3 and the nominal torque shall be used.

The drive shaft and guard shall be moved from the in-line position in a horizontal plane out to the maximum operational angle for the universal joint and back. In this cyclic movement, a dwell period of 5 s ± 2 s at the maximum angle position shall be included. 100 cycles shall be completed within 15 min ± 3 min.

Dimensions in millimetres



Key

1 test fixture
2 universal joint
3 wide-angle universal joint
4 maximum operational angle

Figure 1 — Test master shield and fixture for PTO Types 1, 2, 3, and 4

Table 3 — Dimensions of fixture

PTO Type	Dimensions	
	n	*P*
1 and 2	90^{+2}_{0}	280^{+2}_{0}
3 and 4	105^{+2}_{0}	350^{+2}_{0}

The PTO drive shaft guard shall be deemed to have passed the test if

— the guard has no holes or deformation which leave the shaft unprotected, and

— the guard has no breakage, crack or part separation.

6.4.5 Static axial loading test at ambient temperature

With the PTO drive shaft and guard stationary, an axial force of 250 N between each cone and tube in both directions shall be applied gradually and held for a minimum of 60 s. See Annex A.

With the PTO drive shaft and guard stationary, an axial force of 1 000 N between the guard tube and the PTO drive shaft at every attachment bearing in both directions shall be applied and held for a minimum of 60 s. See Annex A.

Test each end.

The PTO drive shaft guard shall be deemed to have passed the test if

— the guard has no holes or deformation which leave the shaft unprotected, and

— the guard has no breakage, crack or part separation.

6.4.6 Dynamic axial loading test of the bearings at ambient temperature

With the PTO drive shaft rotating and the guard stationary in the test equipment, an axial force of 500 N shall be applied in both directions between the guard and the PTO drive shaft bearings for 60 s. See Annex A.

The PTO drive shaft guard shall be deemed to have passed the test if

— the guard has no holes or deformation which leave the shaft unprotected, and

— the guard has no breakage, crack or part separation.

6.5 Tests at sub-zero temperature

6.5.1 Impact test at sub-zero temperatures

6.5.1.1 The PTO drive shaft and guard shall be supported, as shown in Annex A, in a horizontal straight line by the normal end connections and at the extended length.

6.5.1.2 The PTO drive shaft and guard shall be maintained at −35 °C for at least 1 h before starting the test. Measures shall be taken to ensure that the shaft and guard do not rise above −35 °C at the moment of the test.

6.5.1.3 With the PTO drive shaft and guard at −35 °C, the blows shall be struck in accordance with the sequence a) to c) below using a pendulum as shown in Figure 2. The contact face shall be flat and have a diameter of 50 mm and the contact face edge shall have the radius according to Figure 2.

For drive shafts weighing >200 N (in the test configuration specified in Clause 4), an impact energy of 98 J shall be applied.

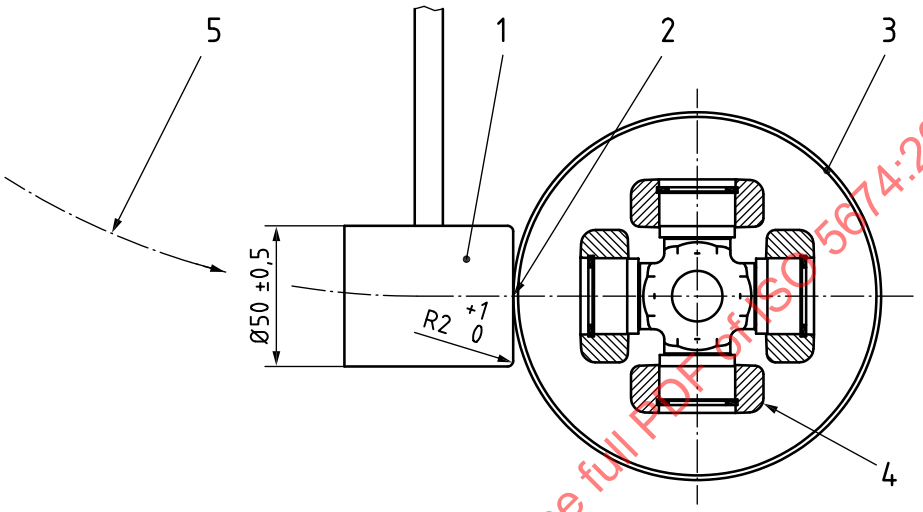
For PTO drive shafts of ≤200 N (in the test configuration specified in Clause 4), half the weight of the PTO drive shaft shall be used in newtons as the value of the impact energy in joules.

a) One blow shall be struck to each cone (to only one cone if both are identical) over the centre of articulation of the universal joint when in line with the PTO drive shaft — the end yoke positioned such that the face of the yoke is parallel to the contact (see Figure 2).

b) One blow shall be struck midway on one of the tubes.

c) One blow shall be struck at the midpoint of the overlap of the tubes.

Dimensions in millimetres



Key

1 pendulum
2 contact face
3 guard cone
4 end yoke position
5 path of pendulum

Figure 2 — Impact test

The PTO drive shaft guard shall be deemed to have passed the test if

— the guard has no holes or deformation which leave the shaft unprotected, and

— the guard has no breakage, crack or part separation.

Cuts caused by the edge of the pendulum are admissible.

6.5.2 Static axial loading test at sub-zero temperatures

The following procedure shall be performed.

The PTO drive shaft and guard shall be maintained at −35 °C for 1 h before starting the test.

With the PTO drive shaft and guard at a standstill and at −35 °C, an axial force shall be applied between the guard tube and the PTO drive shaft in both directions, the force shall be held for a minimum of 60 s. See Annex A.

— If the inner diameter of the outer guard tube, D, is ≤80 mm, the axial force shall be 2,5 kN.

— If D is >80 mm, the force (F) to be used shall be calculated by D × 0,031, where F, expressed in kilonewtons, is a maximum of 3,5 kN, and D is expressed in millimetres.

Each end shall be tested.

The PTO drive shaft guard shall be deemed to have passed the test if

— the guard has no holes or deformation which leave the shaft unprotected, and

— the guard has no breakage, crack or part separation.

6.6 Restraining means test at ambient temperature

6.6.1 Conventional means of attachment

The following procedure shall be performed on conventional means of attachment (chains, ropes, etc.) connected to each independent guard component or assembly.

a) A force of 400 N shall be applied to each fitted restraining member for 60 s, once tangentially and once radially, in a plane perpendicular to the axis of the PTO drive shaft. The means of holding the guard stationary shall not cause damage or permanent deformation to the guard.

b) After 60 s, the radial load shall be increased further until the restraining member fails. The restraining member shall fail at its weakest point, which shall be at the guard end only. The weak point shall fail at a force below 800 N.

At the end of the test, the restraining system (the restraining member or attachment means) shall have no change which impairs its function except for the weak point.

6.6.2 Other restraining means

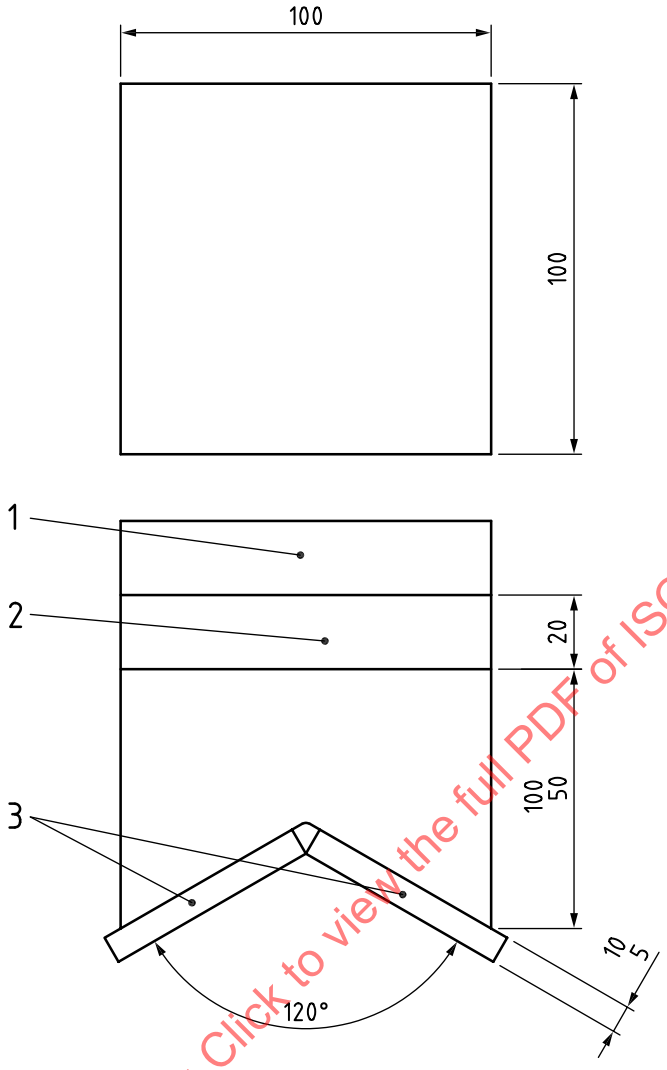
The following test procedure shall be performed on any other restraining means.

a) To test the immobilizing torque of guards, the guarded PTO drive shaft shall be supported in a horizontal, straight line by its usual end connections, compressed to the closed length. The test shall be repeated for the extended shaft and on both halves. The wear test cabinet (see D.3) may be used for this test.

b) With the drive shaft rotating and no restraining system attached or operating, a direct load of 100 N shall be gradually applied perpendicularly to the guard at the midpoint of the overlap of the tubes, to each half of the guard tubing. The load shall be applied using a 100 mm wide, 100 mm long and 50 mm to 100 mm thick beam with a 120° "V"-shaped groove cut through the width. The entire length of the groove of this V-block (see Figure 3) shall be lined with rubber 5 mm to 10 mm thick Shore hardness of A 50 approximately. The rubber shall be attached such that the fastening method does not touch guarding. The beam shall be supported by a 20 mm thick rubber backing of Shore hardness of A 20.

Once the load is fully applied, the guards shall stop rotating completely within 3 s. Whether the guards stopped rotating with the load applied within the 3 s limit shall be recorded.

Dimensions in millimetres



Key

1 steel
2 Shore A 20 rubber
3 Shore A 50 rubber

Figure 3 — V-block

7 Final acceptance criteria

The final acceptance criteria are as follows.

a) The guard and restraining means shall be deemed to have passed the test only when all the applicable tests have been carried out.

b) The identification shall still be marked and still be present after the tests have been carried out.

c) The guard shall still function after all the tests have been carried out and shall have no breakages, cracks or part separation, and no holes or deformations which leave the shaft unprotected.

d) After all the tests have been carried out, the guard shall not have moved on the shaft with reference to its initial position, e.g. the bearing shall remain in the shaft groove.

8 Test report

The test report shall include the following:

— details of PTO drive shaft guard, including all identification marks for the guard and the PTO drive shaft;

— results of all tests;

— a statement to that effect if the guard meets the requirements of Clause 7.

A typical test report is given in Annex C.

Annex A
(normative)

Test schedule — Test sequence for cone and tube guards

A.1 The test sequence for cone and tube guards shall be performed.

A.1.1 Measure the immobilization torque.

A.1.2 Carry out the wear test at 1 300 r/min for PTO drive shafts designed to be used for Type 4 PTO and 1 000 r/min for all other PTO drive shafts:

— first, for 48 h at 85 °C;

— then, for 48 h at ambient temperature.

A.1.3 Measure the immobilization torque.

A.1.4 Carry out maintenance (lubrication, etc.) of the guard bearings, if necessary, according to the maintenance instructions.

A.1.5 Perform the dynamic radial load test of the joint at ambient temperature.

A.1.6 Perform the dynamic radial load test of the tube at ambient temperature.

A.1.7 Perform the dynamic axial load test at ambient temperature.

A.1.8 Measure the immobilization torque.

A.1.9 Carry out the wear test at 1 300 r/min for PTO drive shafts designed to be used for Type 4 PTO and 1 000 r/min for all other PTO drive shafts for 96 h at ambient temperature with dust.

A.1.10 Measure the immobilization torque.

A.1.11 Dismantle the guard from the PTO drive shaft according to the maintenance instructions given in the instruction handbook, and rebuild.

A.1.12 Perform the bearing corrosion test.

A.1.13 Carry out maintenance (lubrication, etc.) of the guard bearings, if necessary, according to the maintenance instructions.

A.1.14 Measure the immobilization torque.

A.1.15 Carry out the wear test at 1 300 r/min for PTO drive shafts designed to be used for Type 4 PTO and 1 000 r/min for all other PTO drive shafts:

— first, for 24 h at 85 °C;

— then, for 24 h at ambient temperature.

A.1.16 Measure the immobilization torque.

A.1.17 Carry out maintenance (lubrication, etc.) of the guard bearings, if necessary, according to the maintenance instructions.

A.1.18 Perform the dynamic radial load test of the joint at ambient temperature.

A.1.19 Perform the dynamic radial load test of the tube at ambient temperature.

A.1.20 Perform the dynamic axial load test at ambient temperature.

A.1.21 Measure the immobilization torque.

A.1.22 Carry out the wear test at 1 300 r/min for PTO drive shafts designed to be used for Type 4 PTO and 1 000 r/min for all other PTO drive shafts, for 48 h at ambient temperature with dust.

A.1.23 Measure the immobilization torque.

A.1.24 Dismantle the guard from the PTO drive shaft according to the maintenance instructions given in the instruction handbook, and rebuild.

A.1.25 Perform the dynamic swivel test.

A.1.26 Perform the static axial load test of the cone at ambient temperature.

A.1.27 Perform the static axial load test of the tube at ambient temperature.

A.1.28 Carry out the impact test at −35 °C.

A.1.29 Perform the static axial load test at −35 °C.

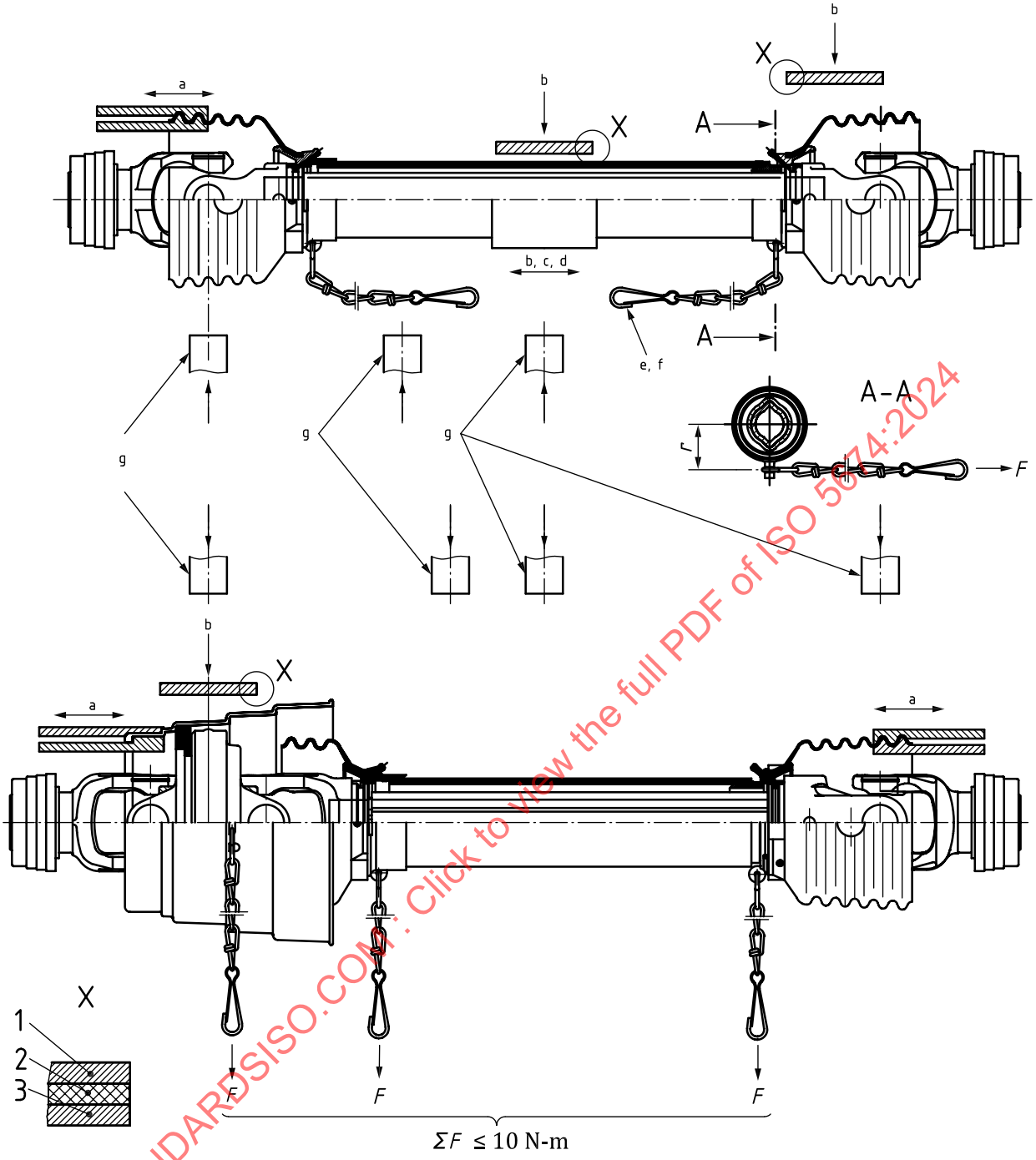
A.1.30 Perform the restraining member attachment test at ambient temperature.

A.1.31 Perform the restraining member test at ambient temperature.

A.1.32 Check the UV test data (see Annex B).

A.1.33 Complete the test report.

See Figure A.1.



Key

1 load

2 rubber

3 wooden beam

a 250 N for 60 s, each cone (see 6.4.5).

b 500 N for 60 s at 1 300 r/min for PTO drive shafts designed to be used for Type 4 PTO and 1 000 r/min for all other PTO drive shafts (see 6.4.2, 6.4.3, 6.4.6).

c 1 000 N for 60 s (see 6.4.5).

d 2,5 kN to 3,5 kN at -35 °C (see 6.5.2).

[e] 400 N for 60 s (see 6.6.1).

[f] >400 N and <800 N for 60 s: weak link shall open (see 6.6.1).

[g] Blows of up to 98 J at -35 °C (see 6.5.1).

NOTE The figure does not include all test requirements.

Figure A.1 — Guard test diagram

Annex B
(normative)

UV test for plastic guards

The following requirements shall be applied when using methods of exposure to laboratory light sources in tests of UV-radiation on plastic guards.

The test specimens and their number shall be in accordance with ISO 4892-1:2016.

Test specimens shall be sample sections of plastic guard components. A minimum of one piece of each different material from the guard of at least 10 mm by 10 mm shall be tested.

Test conditions shall be in accordance with ISO 4892-2:2013/A1:2021.

The black-panel temperature shall be 65 °C ± 3 °C.

Relative humidity shall be 65 % ± 5 %.

The spray cycle shall be

— 18 min ± 0,5 min wet, and

— 102 min ± 0,5 min dry.

A xenon-arc light source shall be used with 505 W/m^2 UV-radiation and filters to simulate daylight relative spectral irradiance (ISO 4892-2:2013/A1:2021 Table 1, Method A).

The test time shall be 1 000 h.

Test report/results: a description of the specimen and method of test shall be included.

a) Colour test: grey-scale colour change shall be in accordance with ISO 105-A02:1993, minimum rating 3.

b) Mechanical test:

   — no cracks shall be detected from checking at 100 × magnification;

   — a manual bending test shall be carried out without visual cracks appearing.

Annex C
(informative)

Typical test report

Description

Tested in accordance with ISO 5674:2024

Date of completion of the test		
Report on test of		PTO drive shaft guard
Mounted on		PTO drive shaft
Length of PTO drive shaft	Closed:	mm
	Extended:	mm
Identification mark on shaft:		
Identification mark on guard:		
Type of guard:		
Maintenance requirements:	Frequency:	
	Type of lubricant:	

UV test data (ISO 5674:2024, 4.1.2)

Test data supplied? Yes/No (delete as applicable)

Comments on data:

Cones

Material:	
Length:	mm
Maximum diameter:	mm

Tubes

Material:

Dimensions:

	Outside diameter	Wall thickness	Length
— outer tube	mm	mm	mm
— inner tube	mm	mm	mm

Method of attachment on shaft:

Type of bearings:

Other features:

Wear test

Torque needed to immobilize guard (ISO 5674:2024, 6.2)

Did the torque needed to immobilize the guard while the shaft rotated exceed 10 N·m

— before the wear test? Yes/No (delete as applicable);

— after the wear test? Yes/No (delete as applicable).

Comments, if any:

Did the guard meet the requirements of 6.2? Yes/No (Delete as applicable).

Strength tests

Axial loading test at ambient temperature (ISO 5674:2024, 6.4.5, 6.4.6)

Ambient temperature: °C

Did cones remain attached on tubes? Yes/No (delete as applicable).

Did guard remain functional? Yes/No (delete as applicable).

Comments, if any: