
Agricultural vehicles — Mechanical connections between towed and towing vehicles —

Part 5:
Specifications for non-swivel clevis couplings

Véhicules agricoles — Liaisons mécaniques entre véhicules remorqueurs et remorqués —

Partie 5: Spécifications pour attelages de type chape non rotatifs

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 4, *Tractors*.

This second edition cancels and replaces the first edition (ISO 6489-5:2011), which has been technically revised. The main changes compared to the previous edition are as follows:

- addition of PTO type 4.

A list of all parts in the ISO 6489 series can be found on the ISO website.

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.

Agricultural vehicles — Mechanical connections between towed and towing vehicles —

Part 5: Specifications for non-swivel clevis couplings

1 Scope

This document specifies the requirements for non-swivel clevis couplings used for the attachment of agricultural trailers and implements equipped with a swivel hitch ring as specified in ISO 5692-3 to the rear of self-propelled agricultural vehicles.

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 286-1, *ISO system of limits and fits — Part 1: Bases of tolerances, deviations and fits*

ISO 500-1, *Agricultural tractors — Rear-mounted power take-off types 1, 2, 3 and 4 — General specifications, safety requirements, dimensions for master shield and clearance zones*

ISO 2768-1:1989, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

ISO 5692-3:2011, *Agricultural vehicles — Mechanical connections on towed vehicles — Part 3: Swivel hitch rings*

3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

non-swivel clevis coupling

hitching device, not rotating around the horizontal longitudinal axis (roll), for the mechanical connection of trailers and implements

3.2

coupling reference centre

point along the pin centreline crossing the horizontal symmetry centreline of the drawbar housing

3.3

D value

D

mathematically established representative force for the horizontal component of the force acting on the coupling in the longitudinal axis of the machine

Note 1 to entry: It is expressed in kilonewtons (kN).

3.4

vertical load on the coupling point

S

load transmitted, under static conditions, on the reference centre of the mechanical coupling

Note 1 to entry: It is expressed in kilograms (kg).

4 Constructional requirements

Constructional requirements not given in this document shall be specified as appropriate. Tolerances on dimensions without individual tolerance indications shall be in accordance with ISO 2768-1:1989, tolerance class c. Limits and fits shall be in accordance with ISO 286-1.

The dimensions of coupling devices of shapes w, x, y and z shall be in accordance with [Figure 1](#) and [Table 1](#).

5 Calculation of *D* value

The *D* value shall be calculated, in kilonewtons, using [Formula \(1\)](#), where the values of m_r and m_t are known:

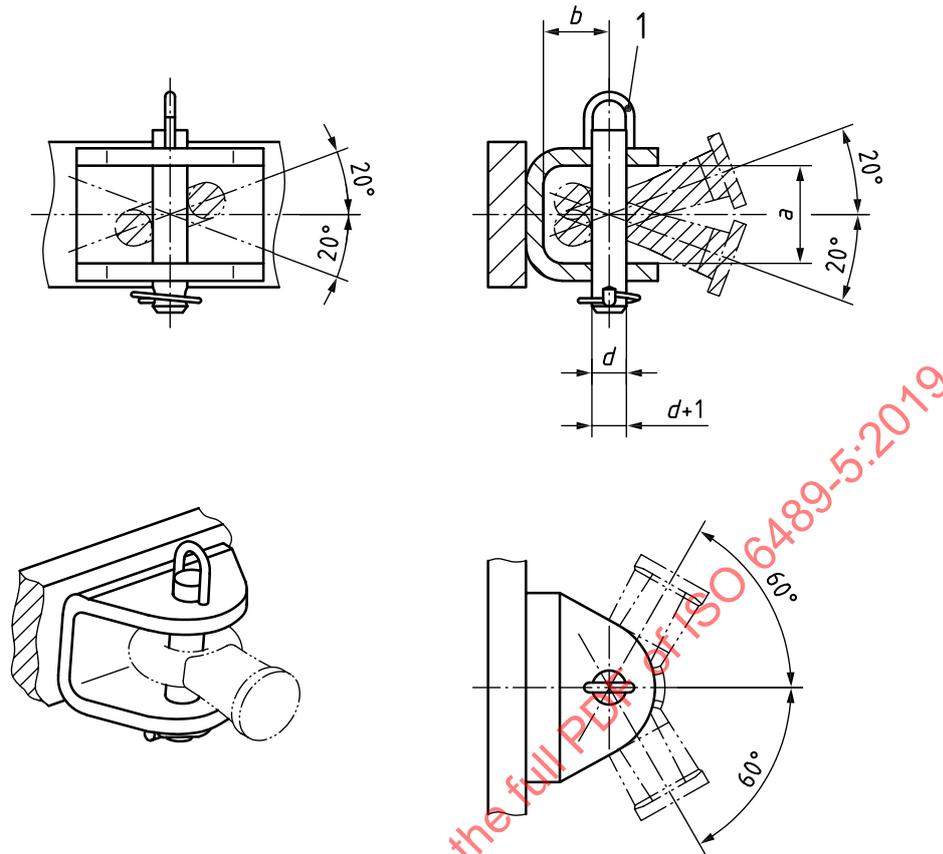
$$D = g \times \left(\frac{m_t \times m_r}{m_t + m_r} \right) \quad (1)$$

where

g is the acceleration due to gravity, 9,81 m/s²;

m_t is the allowable total mass of the tractor or towing vehicle, in tonnes;

m_r is the allowable mass of the trailer or towed implement, in tonnes.



Key

1 optional shape

NOTE Dimensions are given in [Table 1](#).

Figure 1 — Non-swivel clevis coupling

Table 1 — Shapes and dimensions of non-swivel clevis coupling devices

Vertical load <i>S</i> kg	<i>D</i> value <i>D</i> kN	Shape	Dimension mm		
			<i>d</i> ±0,5	<i>a</i> min.	<i>b</i> min.
≤1 000	≤35	w	18	50	40
≤2 000	≤90	x	28	70	55
≤3 000	≤120	y	43	100	80
≤3 000	≤120	z	50	110	95

6 Design requirements

6.1 The coupling unit shape shall allow the swivel hitch ring the following minimum angles:

- ±60° in the horizontal plane (yaw),
- ±20° in the vertical plane (pitch),
- ±20° around its longitudinal axis (roll).

6.2 Where a sub-frame is used between the agricultural tractor or towing vehicle and the coupling, this shall be tested with the appropriate coupling, according to the maximum coupling capacity.

6.3 The non-swivel clevis coupling unit shall be provided with a device to prevent unintentional uncoupling. This device shall be

- easy to apply,
- retained on the hitch unit, and
- tested by the application of a static load of $0,25D$.

6.4 The clevis shall be designed for the D values specified in [Table 1](#).

7 Location

The non-swivel clevis coupling shall be located as shown in [Figure 2](#), mounted in the plane of the tractor's or towing vehicle's longitudinal axis. The centre of the non-swivel clevis coupling shall be located at the distance, t , rearwards from the end of the power take-off (PTO) shaft, in accordance with [Table 2](#). The coupling shall be located as high as possible, without any part of the clevis/ring coupling or its construction (e.g. keeper) entering the clearance zone specified for the PTO in ISO 500-1.

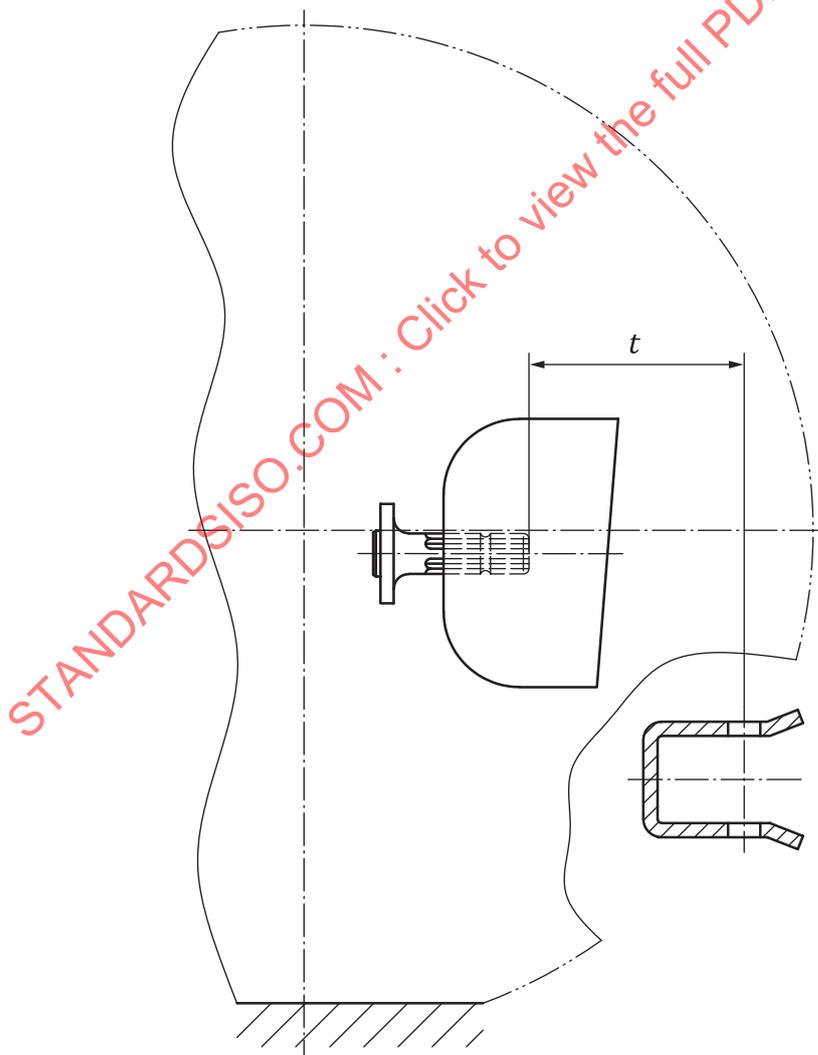


Figure 2 — Non-swivel clevis coupling — Relation to power take-off (PTO)

Table 2 — Distance between non-swivel coupling and power take-off (PTO)

Coupling shape	<i>t</i> mm	
	PTO types 1 and 2 ^a	PTO types 3 and 4 ^a
w	80 – 400	65 – 500
x	100 – 400	85 – 500
y	120 – 400	105 – 500
z	130 – 400	115 – 500

^a See ISO 500-1 for identification of PTO types.

8 Permissible mechanical connections between rings and couplings

See [Table 3](#).

Table 3 — Permissible mechanical connections between rings and couplings

Coupling	Ring
ISO 6489-5 Shape w	ISO 5692-3 Shape W
ISO 6489-5 Shape x	ISO 5692-3 Shape X
ISO 6489-5 Shape y	ISO 5692-3 Shape Y
ISO 6489-5 Shape z	ISO 5692-3 Shape Z

9 Marking

The non-swivel clevis coupling shall have a permanent and visible coupling shape letter marking and ISO 6489-5 reference for the identification.