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Agricultural trailers and trailed equipment — Drawbar jacks —

Part 1: Design safety, test methods and acceptance criteria

Remorques agricoles et matériel traîné — Béquilles d'attelage — Partie 1: Sécurité par conception, méthode d'essai 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 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).

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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 3, *Safety and comfort*.

This first edition of ISO 12140-1, together with ISO 12140-2, cancels and replaces ISO 12140:2013, which has been technically revised.

The main changes compared to the previous edition are as follows:

— the application requirements have been moved to a separate part (i.e. ISO 12140-2);

— the term used for describing machinery types has been clarified.

A list of all parts in the ISO 12140 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 trailers and trailed equipment — Drawbar jacks —

Part 1: Design safety, test methods and acceptance criteria

1 Scope

This document specifies criteria for construction, establishes performance test methods and defines acceptance criteria for telescopic mechanical screw- and nut-type drawbar jacks and hydraulic drawbar jacks intended to be fitted on the implement tongue of interchangeable towed machinery [here after referred to as "implement(s)"] as original equipment or as replacement jacks. In addition, it specifies minimum markings and information for use to be provided by the jack manufacturer.

These jacks are used specifically for

— supporting the hitch points of implements during storage;

— lifting and lowering of implement tongues to facilitate attaching to or disconnecting from an agricultural tractor; and

— levelling an implement for stationary use.

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 cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

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
jack
hand or power-operated telescopic mechanism with a ground contact pad (base) or wheel and fixing point [*jack mount* (3.11) or mounting point] designed for controlled vertical movement

Note 1 to entry: A hand-operated jack typically uses mechanical means to control vertical movement. A powered-operated jack typically uses hydraulic fluid displacement to control vertical movement.

3.2
static compressive load
vertical force used to support the intended application under static conditions

3.3
dynamic compressive load
vertical force used to lift the intended application measured during actuation of the jack

3.4
static tensile load
force opposite of *static compressive load* (3.2) resulting in a tension load applied to the *jack* (3.1)

3.5
dynamic tensile load
force opposite of dynamic *compressive load* (3.3) resulting in a tension load applied to the *jack* (3.1)

3.6
side load
<fore-aft>force applied in a plane perpendicular to the longitudinal axis of the *jack* (3.1) in a direction generally aligning with the towing direction of the implement

3.7
side load
<lateral>force applied in a plane perpendicular to the longitudinal axis of the *jack* (3.1) at right angles to the general towing direction of the implement

3.8
screw and nut
threaded shaft and nut that transforms rotational motion of the *crank assembly* (3.13) into linear motion of the *jack* (3.1)

3.9
outer tube
tube with the largest cross-sectional dimension

3.10
inner tube
free-moving and generally smaller tube moving within the *outer tube* (3.9)

3.11
jack mount
portion of the *outer tube* (3.9) that mates with the implement mount

3.12
swivel mount
mounting method that allows the *jack* (3.1) to be rotated to a storage position without removing the jack from the implement

3.13
crank assembly
device used to actuate the *screw* (3.8) to extend or retract the *jack* (3.1)

3.14
base
contact pad
bottom load bearing portion of the *inner tube* (3.10) or drop leg, if provided, that transmits force to the ground or floor

3.15
jack cycle
extension of the jack through 65 % of the jack travel and retraction back to its original length

Note 1 to entry: If a particular jack has added travel for the purpose of greater unloaded range, the jack cycle can be based on 65 % of the normal travel.

3.16
extended length
maximum attainable dimension from the centre of the *jack mount* (3.11) to the bottom of the *base* (3.14) of the *jack* (3.1)

3.17
basic rated life
L_{10}
90 % of the reliable life of samples tested that pass a given requirement

3.18
rated static compressive load capacity
static compressive load (3.2) that the *jack* (3.1) is rated to support or sustain while meeting the requirements of this document

3.19
rated dynamic compressive load capacity
dynamic compressive load (3.3) that the *jack* (3.1) is rated to repeatedly lift while meeting the requirements of this document

3.20
rated static tensile load capacity
static tensile load (3.4) that the *jack* (3.1) is rated to sustain while meeting the requirements of this document

3.21
rated dynamic tensile load capacity
dynamic tensile load (3.5) that the *jack* (3.1) is rated to repeatedly pull while meeting the requirements of this document

3.22
rated static side load capacity
side load (3.6, 3.7) that the *jack* (3.1) is rated to sustain while meeting the requirements of this document

3.23
rated static side torque class
value generated by calculating the torque resulting from the *rated static side load capacity* (3.22) and the *extended length* (3.16)

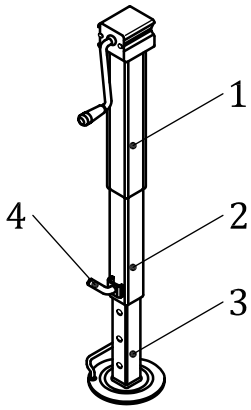
Note 1 to entry: See Table 1.

Note 2 to entry: Intended for jacks manufactured with specific mount/mounting location, this is an indicator of the maximum torque to be withstood resulting from side loading independent of *jack* (3.1) length.

3.24
crank effort
tangential force, measured at the crank handling position, required to actuate the *jack* (3.1)

3.25
drop leg
free moving element that has the smallest section tube in a telescopic jack

Note 1 to entry: See Figure 1.



Key

1 outer tube (3.9)
2 inner tube (3.10)
3 drop leg (3.25)
4 locking pin

Figure 1 — Example of drop leg

4 Design requirements

4.1 Base

The base of the jack shall be substantially flat and shall be of sufficient size so that the average ground pressure does not exceed 760 kPa at the rated dynamic compressive load capacity. The base shall be securely fixed to the inner tube or, if provided, to the drop leg of the jack. Jacks equipped with a wheel or other base configuration intended for use on an improved or special surface are excluded from this requirement.

4.2 Jack overtravel

4.2.1 The jack shall be fitted with sufficient means to withstand the applied force when attempting to extend or retract beyond the intended travel.

4.2.2 Screw- and nut-type jacks shall be able to sustain one and one-half times the maximum crank effort experienced at the rated dynamic compressive lift capacity or if applicable, the rated dynamic tensile load capacity without a functional or catastrophic failure.

4.3 Hydraulic jacks

4.3.1 Controls shall be designed to provide a means of operation and adjustment which will protect the operator and others from injury when operated in accordance with the manufacturer's instructions. Controls shall be clearly marked with the direction of movement of the jack (for example, up/down).

4.3.2 A means to minimize the risk of unintended retraction (for example, a locking device) shall be provided.

4.4 Drop leg

A drop leg, if provided, shall be equipped with

— a locking pin with its axial retaining device;

— drop leg safety retaining device.

See Figure 1 for example.

5 Performance requirements

5.1 Crank effort

During the jack cycle, the crank effort shall not exceed 225 N while the jack is loaded to its rated dynamic compressive load capacity or if applicable, its rated dynamic tensile load capacity. If the crank effort exceeds 110 N a knob shall be included in the crank assembly. The knob shall be designed to rotate freely on the crank.

5.2 Corrosion protection

5.2.1 The components of the jack which are directly exposed to external environment shall have a duration of not less than 48 hours when exposed to salt spray exposure, according to ISO 9227, before the appearance of rust.

5.2.2 This requirement is considered to be fulfilled if the test is made on a small portion of the painted metal of the jack.

NOTE Guidance can also be drawn from ASTM B-117-09.

5.3 Water ingress

The jack shall be designed to minimize the ingress of rain water and to promote drainage of any water that does enter.

5.4 Basic rated life

The basic rated life for the jack shall be greater than 250 jack cycles when tested in accordance with this document.

5.5 Rated static compressive load capacity

The rated static compressive load capacity shall not exceed one half that of the static compressive load sufficient to cause catastrophic failure. This load shall be applied through the intended jack mount or swivel mount. The jack shall also be able to support the rated static compressive load and afterward meet the requirements of 6.12.

NOTE This is a maximum value and can be reduced by the jack or implement manufacturer based on application.

5.6 Rated dynamic compressive load capacity

The rated dynamic compressive load capacity shall not exceed the largest dynamic compressive load to be moved by the jack through a jack cycle while meeting the basic rated life requirements of this document. In addition, for screw- and nut-type jacks the crank effort requirements shall not be exceeded. This load shall be applied through the intended jack mount or swivel mount. The jack shall