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**Agricultural machinery — Agricultural  
trailers and trailed equipment —  
Drawbar jacks**

*Matériel agricole — Remorques agricoles et matériel traîné —  
Béquilles d'attelage*

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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. [www.iso.org/directives](http://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. [www.iso.org/patents](http://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.

The committee responsible for this document is ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 3, *Safety and comfort*.

This second edition cancels and replaces the first edition (ISO 12140:1998), which has been technically revised.

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# Agricultural machinery — Agricultural trailers and trailed equipment — Drawbar jacks

## 1 Scope

This International Standard specifies terms and definitions, establishes test procedures, and creates minimum performance requirements for telescopic mechanical screw-type jacks or hydraulic jacks mounted on agricultural implements as original equipment and/or replacement jacks.

Furthermore, this International Standard defines terms, establishes test procedures, and creates minimum acceptance criteria for the use of telescopic mechanical screw-type jacks or hydraulic jacks mounted on agricultural implements as original equipment jacks or jacks fitted with a jack attachment mounts (both weld-on and removable). 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 towed agricultural implements during storage;
- lifting and lowering of implement hitches to facilitate attaching to or disconnecting from an agricultural tractor or other agricultural machines;
- levelling of machinery for stationary use.

NOTE Drawbar jacks as part/component of a machine are also covered by ISO 4254-1:2013.

## 2 Normative references

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

ISO 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

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.

### 3.1 jack

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

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

### 3.2

#### towed agricultural implement

machine or device that is designed to perform agricultural field operations and is pulled by an agricultural tractor or other agricultural machine and is usually equipped with wheels required for transport

**3.3**

**static compressive load**

vertical force measured at the jack location under static conditions

**3.4**

**dynamic compressive load**

vertical force measured at the jack location during jack extension (lifting)

**3.5**

**static tensile load**

force opposite of static compressive load resulting in a tension load applied to the jack

**3.6**

**dynamic tensile load**

force opposite of dynamic compressive load resulting in a tension load applied to the jack

**3.7**

**side load**

<fore-aft> force applied in a plane perpendicular to the longitudinal axis of the jack in a direction generally aligning with the towing direction of the towed agricultural implement

**3.8**

**side load**

<lateral> force applied in a plane perpendicular to the longitudinal axis of the jack at right angles to the general towing direction of the towed agricultural implement

**3.9**

**screw and nut**

threaded portion of the jack that transforms rotational motion of the crank assembly into linear motion of the jack

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**3.10**

**screw travel**

total change in length of the jack from a fully retracted to a fully extended condition caused by screw movement only

**3.11**

**swivel mount**

jack mounting method that allows the jack to be rotated to a storage position without removing the jack from the towed implement

**3.12**

**crank assembly**

portion of the jack consisting of a crank and knob used to actuate the screw to extend or retract the jack

**3.13**

**side wind jack**

assembly of crank, knob, outer tube, inner tube and screw/nut that causes the extension or retraction of the jack when the crank assembly is rotated about an axis perpendicular to the screw travel

**3.14**

**top wind jack**

assembly of crank, knob, outer tube, inner tube and screw/nut that causes the extension or retraction of the jack when the crank assembly is rotated about an axis of rotation parallel to the screw travel

**3.15**

**base**

bottom load-bearing portion of the inner tube that transmits force to the ground or floor

**3.16****jack cycle**

cycle consisting of extending the jack through 65 % of the jack screw travel and then retracting the jack back to its original length

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

**3.17****retracted length**

minimum attainable dimension from the centre of the mount to the bottom of the base of the jack

Note 1 to entry: In the case where the jack mount is not part of the jack during manufacture, use the uppermost part of the outer tube as the upper measuring point.

**3.18****extended length**

maximum attainable dimension from the centre of the mount to the bottom of the base of the jack

Note 1 to entry: In the case when the jack mount is not part of the jack during manufacturing, use the uppermost part of the jack outer tube as the upper measuring point.

**3.19****basic rated life**

$L_{10}$

term taken from bearing terminology, indicating that the 90 %-reliable life of the samples tested pass a given requirement

**3.20****crank effort**

tangential force, measured at the crank knob position, required to actuate the jack

**3.21****jack stand system**

includes the jack, attaching structure of the towed implement, jack mount, and attached components

**3.22****implement tongue**

that portion of the machine designed to be attached to the drawbar or hitch of the towing machine

**3.23****drawbar**

mechanical connection mounted on the rear of an agricultural tractor or other agricultural machine for the mechanical coupling of an implement

**3.24****towed implement mount**

part of the implement tongue designed to mount or accept the jack

**3.25****largest application vertical static load**

static compressive load when the intended application is at the maximum rated weight configuration

**3.26****normal operational length**

jack extended to its application length to properly support and lift the implement tongue to the appropriate height for hitching to the towing machine

Note 1 to entry: If the application length is unknown, the operational length shall be the maximum extended length of the jack.

## 4 Requirements

### 4.1 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. The knob on the crank assembly shall be designed to rotate freely on the crank and the knob shall have a radial dimension of not less than 25 mm.

### 4.2 Overtravel

The jack shall be designed with sufficient means to withstand the applied force when attempting to extend or retract beyond the intended screw travel. Without functional or catastrophic failures, the jack 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.

### 4.3 Ground pressure

If the jack is provided with a substantially flat base, the base shall be of sufficient size that the average ground pressure shall not exceed 400 kPa. The implement manufacturer may include or recommend additional support to meet the required value. Jacks equipped with a wheel or other base configuration intended for use on an improved or special surface are excluded from this requirement.

### 4.4 Corrosion protection

The jack shall not experience a functional failure after a 48-h salt spray exposure in accordance with ISO 9227.

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

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### 4.5 Service life

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The service life for the jack shall be greater than 250 jack cycles when tested in accordance with this International Standard.

### 4.6 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 all other requirements of this International Standard. This is a maximum value and may be reduced by the jack or implement manufacturer based on application.

### 4.7 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, and shall meet the service life and crank effort requirements of this International Standard. This load shall be applied through the intended jack mount or swivel mount. The jack shall also independently meet all other requirements of this International Standard. The rated dynamic compressive load capacity shall not exceed the rated static compressive load capacity. This is a maximum value and may be reduced by the jack or implement manufacturer based on application.

### 4.8 Rated static tensile load capacity

The rated static tensile load capacity shall not exceed one half that of the static tensile 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 tensile load and afterward meet all other



requirements of this International Standard. This is a maximum value and may be reduced by the jack or implement manufacturer based on application.

#### 4.9 Rated dynamic tensile load capacity

The rated dynamic tensile load capacity shall not exceed the largest dynamic tensile load to be repeatedly retracted (pulled) by the jack, and shall meet the service life and crank effort requirements of this International Standard. This load shall be applied through the intended jack mount or swivel mount. The jack shall also independently meet all other requirements of this International Standard. The rated dynamic tensile load capacity shall not exceed the rated static tensile load capacity. This is a maximum value and may be reduced by the jack or implement manufacturer based on application.

#### 4.10 Rated static side load capacity

The rated static side load capacity shall not exceed one-half that of the static side 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 side load and afterward meet all other requirements of this International Standard. The rated static side load capacity is the least value resulting from loading in any direction, such as fore-aft, lateral or other. This is a maximum value and may be reduced by the jack or implement manufacturer based on application.

#### 4.11 Rated static side torque class

Jacks that have been manufactured with a specific mount or mounting location shall be classified in accordance with [Table 1](#).

The rated static side torque shall be calculated as follows: rated static side torque is equal to rated static side load times the distance from the jack mounting location to the bottom of the base at maximum extension.

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**Table 1 — Rated static side torque classes**

Class	Torque, in Newton metres Nm
I	<1351
II	1 351 to 2 050
III	2 051 to 2 700
IV	2 701 to 3 400
V	3 401 to 4 100
VI	4 101 to 5 400
VII	>5 400

#### 4.12 Crank assembly

If the design of a mechanical jack includes a crank assembly for controlling the height adjustment of the drawbar, it shall be possible to stow the handle to avoid impalement.

#### 4.13 Prevention of ground contact when not in use

The jack shall be either so designed, or have such a device installed, that it can be prevented from winding or dropping down by its own volition while the towed agricultural equipment or trailed equipment is in motion over the ground.