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Agricultural trailers and trailed equipment — Drawbar jacks —

Part 2: Application safety, test methods and acceptance criteria

Remorques agricoles et matériel traîné — Béquilles d'attelage —

Partie 2: Sécurité d'application, méthodes d'essai et critères d'acceptation

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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 3, *Safety and comfort*.

This first edition of ISO 12140-2, together with ISO 12140-1, 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 this document;

— the terms used for describing parameters have 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 2:
Application safety, test methods and acceptance criteria

1 Scope

This document specifies safety requirements, test procedures, and establishes minimum acceptance criteria for the application of telescopic mechanical screw- and nut-type drawbar jacks and hydraulic drawbar jacks intended to be fitted on the implement tongue of interchangeable towed machinery and hereafter referred to as "implement(s)" as original equipment or jacks fitted with a jack attachment mount.

This document applies to implement mounted jacks or jacks fitted with a jack attachment mount. 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 of machinery for stationary use.

The drawbars are those which are designed to couple with the mechanical connections of towing 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 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 12140-1, *Agricultural trailers and trailed equipment — Drawbar jacks — Part 1: Design safety, test methods and acceptance criteria*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12140-1 and the following 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
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

3.2
implement tongue
portion of the machine designed to be attached to the *drawbar* (3.3) or hitch of the towing machine

3.3
drawbar
mechanical connection mounted on the rear of an agricultural tractor or towing machine for the mechanical coupling of an *implement* (3.1)

3.4
implement jack mount
part of the *implement tongue* (3.2) designed to mount or accept the jack

3.5
jack stand system
jack, attaching structure of the implement, *implement jack mount* (3.4), and attached components

3.6
largest application vertical static load
static compressive load when the intended application is at the maximum rated weight configuration specified by the implement manufacturer

3.7
normal operational length
length to which the jack is extended to properly support and lift the implement tongue off the towing machine drawbar

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

4 Application requirements

4.1 Ground pressure

The jack shall be fitted in such a way that the average ground pressure shall not exceed 760 kPa at rated dynamic compressive load capacity. 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 Prevention of ground contact when not in use

The jack shall be designed, or have a device installed, to prevent from winding or dropping down unexpectedly while the implement is in motion.

4.3 Security in operating position

For jacks which can be folded or moved into a storage position when not in use, it shall be possible to locate them securely in the working position. The jack shall be lockable either by design or by other means in the storage and operating positions. Supporting or height adjusting of the drawbar shall be recommended only when the jack is locked in operating position. This requirement shall be verified during the test described in 4.6.3.1.

4.4 Hydraulic components and fittings

Hydraulic systems for hydraulic jacks shall comply with the safety requirements of ISO 4413.

4.5 Application performance

4.5.1 General

These performance requirements apply when the jack is mounted to the implement in the manner and location dictated by the implement design. Performance requirements shall be verified either by analytical methods or by successful performance of the tests described in 4.6.3.

4.5.2 Static vertical load

The jack stand system shall be capable of withstanding a static vertical load equal to 200 % of the largest application vertical static load with no functional or catastrophic failure.

4.5.3 Static side load

The jack stand system shall be capable of withstanding a static vertical load of 120 % of largest application vertical static load while applying a static side load of 50 % of the largest application vertical static load to the jack.

4.6 Jack stand system application tests

4.6.1 General procedures and installation of jack

a) For all tests, the jack shall be installed according to the manufacturer's instructions on an implement tongue or a simulated fixture and fitted with the same mounting hardware with which the jack would normally be mounted.

b) All forces and restraints shall be applied in such a manner as to closely simulate actual field conditions.

c) A new jack shall be used for each test.

   A break-in period of 10 jack cycles can be used for each new jack.

d) Thermal and environmental conditions shall, as much as possible, closely resemble field or application conditions.

e) Jack actuation force shall resemble the input force in both type and direction found in actual practice.

   Jack actuation generally consists of a force at an offset distance as determined by the crank assembly.

f) If the intended application includes an outboard bearing, elimination of the tangential crank effort can more closely simulate field experience.

4.6.2 Ground contact pressure calculation

4.6.2.1 The average ground pressure, ρ, shall be determined using Formula (1):

$$\rho = \frac{F}{A} \tag{1}$$

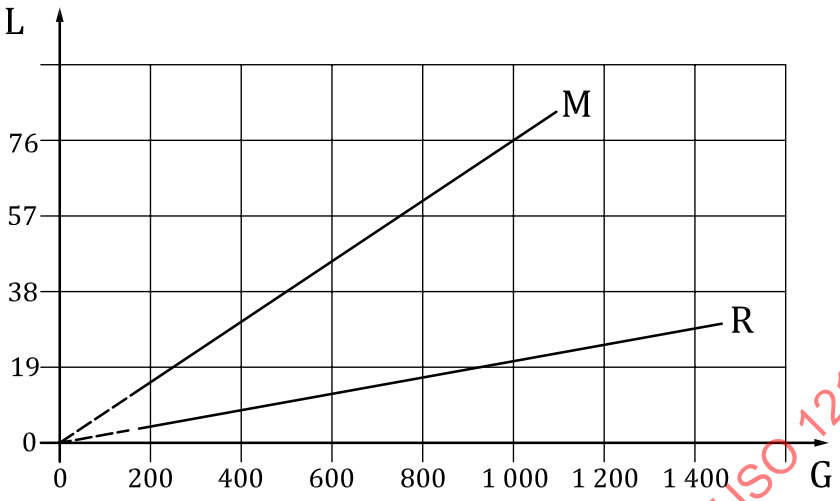
where

F is the load (dynamic compressive load) on jack, in kN;

A is the projected area of the jack base, in m^2.

4.6.2.2 The average ground pressure, ρ, shall not exceed 760 kPa.

Where use of the jack on soft ground (for example, sand) is envisioned, the area of the ground contact pad should be increased. Refer to Figure 1 for guidance.



Key

L jack load, in kN

G ground contact pad (base) area, in m^2

M maximum jack load (see 4.1)

R recommended jack load for soft ground

Figure 1 — Jack load and recommended ground contact pad (base) area

4.6.3 Capacity tests

4.6.3.1 Maximum static application vertical load capacity test

The maximum static application vertical load capacity shall be tested in accordance with the following procedure.

a) Mount jack according to 4.6.1.

b) Extend the jack to its normal operational length.

c) Apply a static load equal to 200 % of the largest application vertical static load.

d) Evaluate according to 4.6.4 and 4.6.5.

4.6.3.2 Maximum static application side load capacity test

The maximum static application side load capacity shall be tested in accordance with the following procedure.

a) Mount jack according to 4.6.1.

b) Extend the jack to its normal operational length.

c) Apply 120 % of the largest application vertical static load.

d) With the base of the jack held against a rigid vertical step, apply a horizontal side load equal to 50 % of the largest application vertical static load at the mechanical coupling of the implement.

The horizontal side force shall be applied in the direction deemed most likely to cause a jack stand system failure.

e) Evaluate according to 4.6.4 and 4.6.5.

4.6.3.3 Acceptance criteria

When the test force has been removed, there shall be no functional failure of the jack according to 4.6.4 or catastrophic failure of the jack according to 4.6.5.

4.6.4 Functional failure

The jack or jack stand system is described as having a functional failure if the jack does not meet any one of the following items.

a) Have the ability to complete 10 jack cycles loaded to the dynamic compressive load;

b) In the case of a swivel mount, the jack shall be able to rotate;

c) If a drop leg is fitted, it shall be verified that the drop leg safety retaining device and the locking pin and its retaining device function properly.

4.6.5 Catastrophic failure

The jack or jack stand system is described as having a catastrophic failure if the jack or jack stand system exhibits any of the following:

— structural failure;

— visible cracking;

— permanent deformation.

4.7 Load holding requirements for hydraulic jack stand systems

To test the loading holding capabilities of the jack system, the following procedure shall be followed.

a) Attach the jack in accordance with 4.6.1.

b) Apply a load equal to the static compressive load.

c) Extend the jack to its maximum length and measure the vertical height of the point of application of the load. At each interval of 10 min over a period of 30 min, re-measure the vertical height.

d) The decrease in the height of the point of application of the load after each 10 min interval shall not exceed 1 mm. The ambient temperature and hydraulic fluid temperature at the start of measuring shall be recorded.

5 Information for use — Marking

If the jack stand system has an adjustable mount, an appropriate instruction sign shall be affixed to the implement near the implement jack mount indicating the proper adjustment of the jack or jack stand system.