



NEW ZEALAND

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AS-NZS 2615 (2004) (English): Hydraulic trolley jacks [By Authority of Australian Consumer Protection Notice No. 10 of 2008]

*We will sell to no man,
we will not deny or defer to any man either justice or right.*

Magna Carta—Tūtohingā Nui

*Kore rawa e hoko ki te tangata, e kore e whakakāhoretia,
e tautuku rānei te tangata ki te ture, tika ranei.*



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Australian/New Zealand Standard™

Hydraulic trolley jacks



AS/NZS 2615:2004

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee CS-055, Car Jacks and Trolley Jacks. It was approved on behalf of the Council of Standards Australia on 7 April 2004 and on behalf of the Council of Standards New Zealand on 30 April 2004. It was published on 27 May 2004.

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Australian Automobile Association
Australian Automotive Aftermarket Association
Australian Competition and Consumer Commission
Australian Industry Group
Australian Retailers Association
Certification Bodies (Australia)
Competition and Consumer Policy Division, Department of the Treasury
Consumer Affairs Victoria
Consumers Federation of Australia
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Australian/New Zealand Standard™

Hydraulic trolley jacks

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CS-055, Car Jacks and Trolley Jacks to supersede AS/NZS 2615:1995.

The Standard was originally prepared in response to requests from the Victorian Automobile Chamber of Commerce and the Consumers Association of Victoria, which were concerned about the safety and quality of manufacture of hydraulic trolley jacks.

In this revision, Appendix F has been added, which sets out the method for determining the load which a hydraulic trolley jack can lift using an operating force on the handle of not more than 450 N.

Suppliers of hydraulic trolley jacks should take cognizance of the regulations under the Trade Practices Act relating to the supply of these products.

The term 'normative' has been used in this Standard to define the application of the appendix to which it applies. A 'normative' appendix is an integral part of a Standard.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Hydraulic trolley jacks

1 SCOPE

This Standard specifies requirements for the design, construction, performance and labelling of hydraulic trolley jacks designed to raise vehicles. It does not include devices that raise an entire vehicle.

Requirements for vehicle jacks, i.e. jacks in which the load is directly transferred from the head cap to the base, are specified in AS/NZS 2693.

2 OBJECTIVE

The objective of this Standard is to provide manufacturers, importers, consumers, retailers and testing bodies with a set of performance requirements which include technical specifications and test methods for hydraulic trolley jacks.

3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
1192	Electroplated coatings—Nickel and chromium
1789	Electroplated zinc (electrogalvanized) coatings on ferrous articles (batch process)
2581	Pressure-sensitive adhesive labels for general purpose use
AS/NZS	
2693	Vehicle jacks
3750	Paints for steel structures
3750.15	Part 15: Inorganic zinc silicate paint

4 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

4.1 Base plane

The plane of contact between the wheels of the hydraulic trolley jack and the surface upon which the wheels rest (see Figure 1).

4.2 Head cap

The point of contact of the hydraulic trolley jack with the vehicle (see Figure 1).

4.3 Hydraulic trolley jack

A hydraulic trolley jack mounted on a chassis which may be provided with wheels (which may or may not be used to transmit the load) for manoeuvring the hydraulic trolley jack, and which has a handle to position the hydraulic trolley jack under the vehicle and has hydraulic cylinders filled with hydraulic fluid to lift the vehicle.

4.4 Lifting cycle

The operation of raising the head cap of the hydraulic trolley jack, using the handle provided, from its fully lowered position to its fully raised position and then returning it to its fully lowered position (see Figure 1).

4.5 Nominated capacity

The capacity nominated as the maximum load that is to be lifted by the hydraulic trolley jack.

NOTE: The nominated capacity has to be marked on the hydraulic trolley jack (see Clause 7).

4.6 Operating force

The force which has to be applied normal to the handle in order to perform a lifting cycle of the hydraulic trolley jack using the full range of travel of the operating handle and measuring the required operating force throughout the lifting cycle. This applies for all measurements of operating force. The force is measured at the centre of the handgrip or, if there is no handgrip, at a point 50 mm from the operator's end of the handle.

4.7 Vehicle

Any wheeled vehicle used on a road including any towed unit such as a caravan or trailer, except any vehicle used on a railway or tramway.

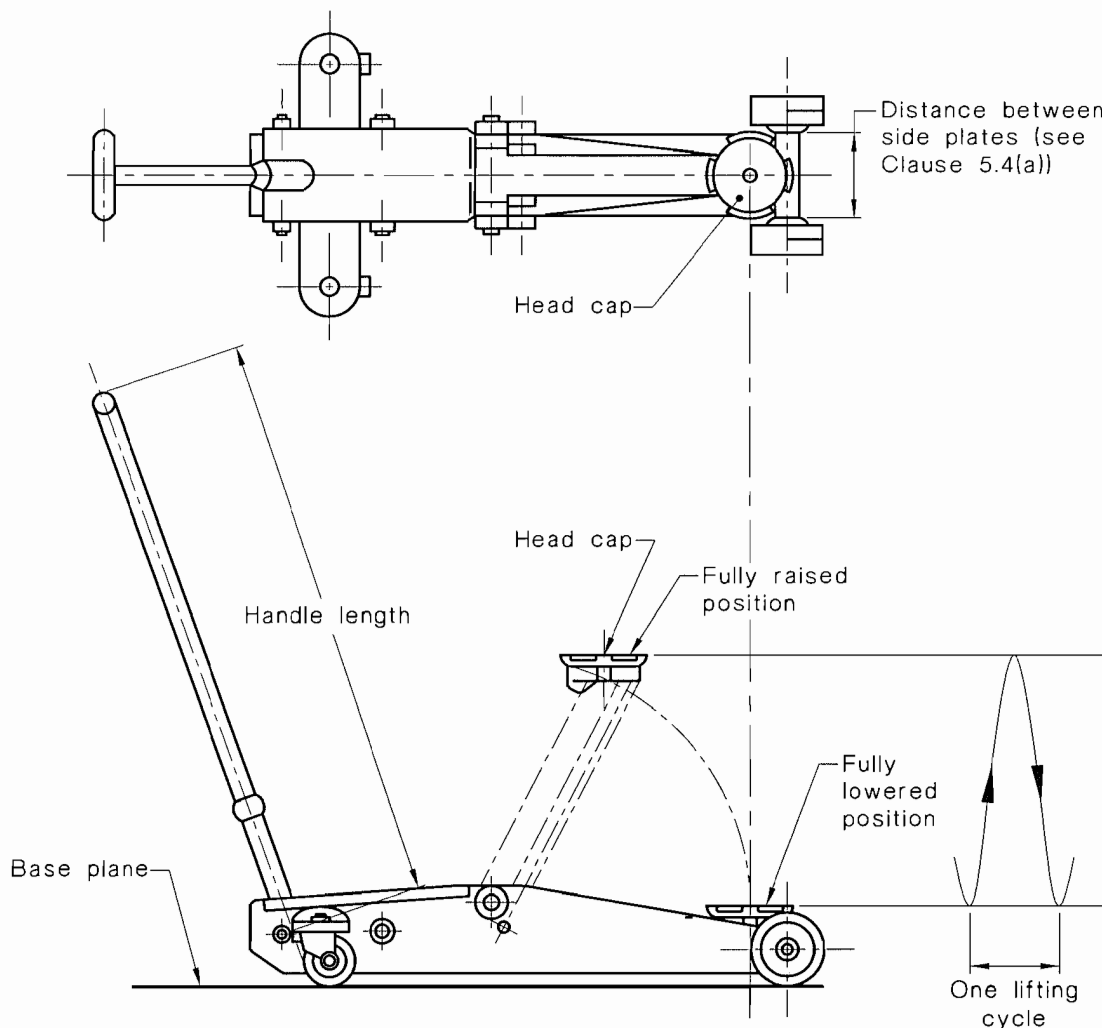


FIGURE 1 TERMINOLOGY FOR A TYPICAL HYDRAULIC TROLLEY JACK

5 DESIGN AND CONSTRUCTION

5.1 General

The hydraulic trolley jack shall be designed and constructed so as to comply with all the relevant requirements specified in this Standard. It shall be free from defects that would affect its durability or serviceability and all screws, pins, bolts and similar parts shall have effective means for preventing loss of proper tightness and adjustment. All bearings and moving parts requiring periodic lubrication shall be provided with readily accessible means of applying lubrication.

The hydraulic trolley jack's hydraulic cylinders shall be filled with correct hydraulic fluid to the recommended level.

If the hydraulic trolley jack supplied is not fully lubricated, necessary instructions for initial lubrication shall be supplied.

5.2 Materials

All materials used in the construction of the hydraulic trolley jack shall have properties to withstand the forces when tested in accordance with Appendices A to F.

5.3 Protective coating

A suitable protective coating shall be applied to the hydraulic trolley jack, except for mating surfaces or sliding parts.

NOTES:

- 1 The purpose of this requirement is to inhibit corrosion.
- 2 Although any suitable protective coating may be used, the protective coating is to be applied using good commercial practice.
- 3 Some examples of suitable protective coatings are specified in AS 1192, AS 1789 and AS/NZS 3750.15.

5.4 Head cap

The head cap of the hydraulic trolley jack shall comply with the following requirements:

- (a) The head cap diameter shall be no smaller than 78% of the width between the side plates of the hydraulic trolley jack measured across the front axle (see Figure 1).
- (b) The head cap shall be free to rotate about a vertical axis.
- (c) The head cap shall remain parallel to the base plane within ± 5 degrees during the lifting cycle at the nominated capacity.
- (d) The head cap shall be capable of retaining a horizontal cylindrical bar of 100 mm nominal diameter when the hydraulic trolley jack assembly is inclined 5 degrees to the horizontal and the head cap is inclined to its maximum out of parallel in the same direction.

NOTE: This is intended to provide a test of the shape of the head cap and its ability to retain a 100 mm diameter axle housing.

- (e) The head cap shall remain, throughout the lifting cycle, vertically above the figure described by joining the points of contact of the hydraulic trolley jack with the base plane.

5.5 Overload protection

The hydraulic trolley jack shall be provided with a means of protection against the raising of the head cap under a load in excess of 15% above its nominated capacity. This measurement shall be recorded when the top of the lifting arm is at the horizontal $\pm 2^\circ$.

5.6 Prevention of overtravel

The hydraulic trolley jack shall be provided with a positive stop to prevent overtravel or the design of the hydraulic trolley jack shall be such that overtravel is effectively prevented.

When the hydraulic trolley jack is tested in accordance with Appendix A, it shall not be possible to induce any overtravel.

NOTE: The provision of a relief port on a hydraulic trolley jack may be an effective means of preventing overtravel. Shear pins are not an adequate means of preventing overtravel as they are subject to sudden failure.

5.7 Minimum capacity

The nominated capacity of the hydraulic trolley jack shall be not less than 750 kg.

6 PERFORMANCE

6.1 Test procedure

The performance tests set out in Clauses 6.2 to 6.7 shall be carried out in such a manner that the forces imposed on the head cap of the hydraulic trolley jack are transmitted to the hydraulic trolley jack's hydraulic lifting system at all times. A new hydraulic trolley jack may be used for each test if required. Except for further testing, any hydraulic trolley jack subjected to tests in Clauses 6.2, 6.6 and 6.7 shall not be re-used.

6.2 Durability

When tested in accordance with Appendix A, the hydraulic trolley jack shall not fail, or become unserviceable.

6.3 Ease of operation

When the hydraulic trolley jack is tested in accordance with Appendix A, neither the initial operating force nor the operating force after conditioning shall be greater than 450 N. Where operating force exceeds 450 N, Appendix F shall be used to determine the maximum capacity of the hydraulic trolley jack to meet the 450 N requirement.

NOTE: The handle provided for operation of the hydraulic trolley jack should, at the area where the operator applies the operating force, be of such size and shape that undue discomfort is not caused.

6.4 Loss of height under load

When determined in accordance with Appendix B, the loss of height under load shall not exceed 5% of the original height of the head cap above the base plane. At the conclusion of 30 minutes, the loss of height shall not exceed 5 mm.

6.5 Lowering

The hydraulic trolley jacks shall provide an operator-activated, controlled lowering mechanism.

When the hydraulic trolley jack is tested in accordance with Appendix C, the operator shall be able to stop the head cap at a given point during the descent within a distance equal to 5% of the full range of travel of the head cap, without hazard to the operator or damage to the hydraulic trolley jack.

6.6 Overload capacity

When tested in accordance with Appendix D, a hydraulic trolley jack shall—

- (a) not collapse or become unstable;
- (b) not suffer a loss of height of the head cap greater than 5% of the original height of the head cap; and

- (c) be capable of lifting its nominated capacity load through one lifting cycle using an operating force not greater than 450 N. Where the operating force exceeds 450 N, Appendix F shall be used to determine the maximum capacity of the hydraulic trolley jack to meet the 450 N requirement.

6.7 Eccentric load test

When tested in accordance with Appendix E, a hydraulic trolley jack shall—

- (a) not collapse or become unstable;
NOTE: One wheel of the hydraulic trolley jack off the ground constitutes instability.
- (b) not suffer a loss of height of the head cap greater than 5% of its original height;
- (c) be capable of lifting its nominated capacity load through one lifting cycle using an operating force not greater than 450 N or where operating force exceeds 450 N, Appendix F shall be used to determine the maximum capacity of the hydraulic trolley jack to meet the 450 N requirement.; and
- (d) when tested in accordance with Appendix E, the head cap of the hydraulic trolley jack shall remain free to rotate about a vertical axis.

NOTE: The purpose of this test is to test the torsional rigidity of the hydraulic trolley jack.

7 MARKING

7.1 Hydraulic trolley jack marking

The hydraulic trolley jack shall be permanently and legibly marked in English with the following:

- (a) The nominated capacity stated as ‘Working Load Limit . . . kg’.
- (b) A warning notice bearing the words as shown in Figure 2 in letters not less than 5 mm high on a contrasting background.
- (c) Clear and necessary operating instructions for the hydraulic trolley jack as follows:
 - (i) The unlifted wheels of the vehicle should be chocked.
 - (ii) The load should be centrally located on the head cap.
 - (iii) No person should remain in a vehicle that is being lifted.
 - (iv) The vehicle manufacturer owner’s manual should be consulted prior to the lifting of the vehicle.
 - (v) The hydraulic trolley jack should be used for lifting and lowering only.
- (d) A statement specifying the correct hydraulic fluid for use with the hydraulic trolley jack and a requirement that it be kept at the recommended level.
- (e) Name and address in Australia or New Zealand of the manufacturer, importer or other suppliers of the hydraulic trolley jack.
- (f) The manufacturing batch identification.

NOTES:

- 1 A permanent marking is one that cannot be removed without the use of a tool such as a screwdriver or scraper.
- 2 A label which has a surface that can absorb grease is not suitable.
- 3 Plastic labels complying with AS 2581 may be suitable.

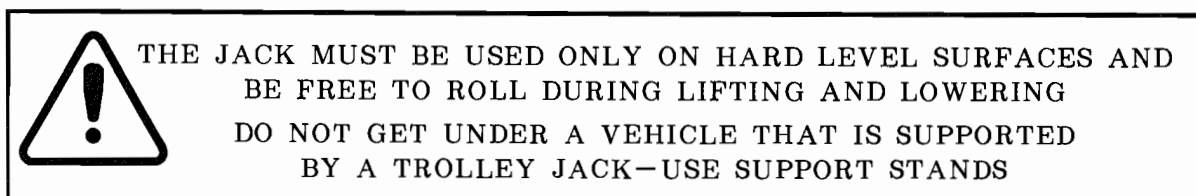


FIGURE 2 EXAMPLE OF A WARNING NOTICE

7.2 Packaging marking

7.2.1 General

The following shall be clearly marked on the packaging of the hydraulic trolley jack:

- (a) The 'height lowered' being the minimum height of the head cap, in millimetres.
- (b) The 'height raised' being the maximum height of the head cap, in millimetres.
- (c) The nominated capacity stated as 'Working Load Limit . . . kg'.

7.2.2 Lubrication warning

If the hydraulic trolley jack requires lubricating before use, then a label or swing label in a contrasting colour shall be attached to the handle bearing the words—

'THIS HYDRAULIC TROLLEY JACK REQUIRES LUBRICATING PRIOR TO USE.'

8 INSTRUCTIONS

In addition to the instructions marked upon the hydraulic trolley jack in accordance with Clause 7.1(c), the following shall be marked on or supplied with the hydraulic trolley jack.

- (a) *Maintenance instructions* Any necessary procedures for maintenance, including lubrication requirements and details for servicing the hydraulic system.
- (b) *Safe usage instructions* Recommendations for safe usage of the hydraulic trolley jack, including the following or words to the same effect:
 - (i) The hydraulic trolley jack should be used on a hard level surface and be free to roll during lifting and lowering.
 - (ii) The unlifted wheels of the vehicle should be chocked.
 - (iii) The load should be centrally located on the head cap.
 - (iv) No person should remain in a vehicle that is being lifted.
 - (v) The hydraulic trolley jack should be used for lifting and lowering only; the raised vehicle should be supported on vehicle support stands.
 - (vi) No person should get bodily under a vehicle that is supported by a hydraulic trolley jack.
 - (vii) The vehicle manufacturer owner's manual should be consulted prior to the lifting of the vehicle.
- (c) *Assembly instructions* Where assembly is required, adequate assembly instructions together with a parts list and an exploded diagram of the hydraulic trolley jack.
- (d) *User instructions* Provide information that this hydraulic trolley jack is designed to be used with a 'XXX mm' diameter head cap, and a handle length of 'YYYY mm' length.

NOTE: Manufacturers making a statement of compliance with this Australian/New Zealand Standard on a product, packaging, or promotional material related to that product are advised to ensure that such compliance is capable of being verified.

APPENDIX A
TESTS FOR DURABILITY, EASE OF OPERATION
AND PREVENTION OF OVERTRAVEL

(Normative)

A1 SCOPE

This Appendix sets out a method for assessing the force required to operate a hydraulic trolley jack both prior to, and at the conclusion of, a 200-cycle durability trial. This Appendix also includes a method for testing whether it is possible to induce overtravel in a hydraulic trolley jack.

A2 APPARATUS

The following apparatus is required:

- (a) A test mass or an equivalent means of applying an approximately constant force, equal to the nominated capacity of the hydraulic trolley jack ($\pm 5\%$), to the head cap as it is being raised.

Where a test mass is used, it shall be constrained so that it can move only in a vertical direction and so that the centre of gravity of the weight remains vertically above the head cap.

- (b) Where a means other than a test mass is employed (e.g. a hydraulic device) it should be capable of measuring and recording the force applied to the head cap and be calibrated to ensure—
- (i) a minimum readability of 1 in 40;
 - (ii) a minimum accuracy of $\pm 5\%$; and
 - (iii) a minimum repeatability of $\pm 5\%$.

The actual force applied to the head cap shall be continuously measured and recorded during the 1st and 202nd lifting cycle. Except for initial 'takeup' the force should not vary by more than 5% of the nominated capacity of the hydraulic trolley jack.

- (c) A device which will measure the operating force normal to the handle at the operating position with an accuracy of $\pm 5\%$.

A3 GENERAL TEST CONDITIONS

The tests shall be carried out on the hydraulic trolley jack in the condition in which it is supplied. It shall be tested using all lifting accessories supplied, any available means of height adjustment (other than that provided by the normal travel of the head cap) and shall be set to its most severe load-bearing position. Tests shall be carried out on a substantially level concrete surface or its equivalent.

The hydraulic trolley jack shall be prepared for use in the normal manner, in accordance with the manufacturer's instructions. The hydraulic trolley jack may be lubricated during the test only in accordance with any lubrication requirements contained in the manufacturer's instructions.

Where an overtravel relief port is provided, it should be activated by a handle force less than the normal operating force, otherwise a force equal to the operating force after conditioning should be applied. Whether any overtravel occurs shall be reported.

Levers other than the handle supplied with the hydraulic trolley jack shall not be used for the test. This does not preclude the use of an automatic device to pump the hydraulic trolley jack, provided that such device bears on the handle of the hydraulic trolley jack.

Lifting cycles shall be carried out at a rate which corresponds to actual use and shall be repeated at intervals which are sufficiently long to prevent overheating.

A4 PROCEDURE

The procedure shall be as follows:

- (a) Apply a force, equivalent to the nominated capacity of the hydraulic trolley jack, to the head cap.
- (b) Subject the hydraulic trolley jack to one lifting cycle using the full range of travel of the operating handle and measure the required operating force throughout the lifting cycle. This is the initial operating force.
- (c) Subject the hydraulic trolley jack to a further 200 lifting cycles against an approximately constant force equal to the nominated capacity of the hydraulic trolley jack.
- (d) Subject the hydraulic trolley jack to another (202nd) lifting cycle using the full range of travel of the operating handle against an approximately constant force equal to the nominated capacity of the hydraulic trolley jack and measure the required operating force throughout the lifting cycle. This is the operating force after conditioning.
- (e) Unload the hydraulic trolley jack and examine it for failure, deformation of components and serviceability.
- (f) Raise the head cap to the limit of its travel against no load.
- (g) Apply a force to the handle equal to the operating force after conditioning. Note whether any overtravel occurs.

A5 REPORT

The following shall be reported:

- (a) The initial operating force and the operating force after conditioning, in newtons.
- (b) Any failure or impediment to serviceability noted in Paragraph A4(e).
- (c) Whether it was possible to induce any overtravel of the hydraulic trolley jack.
- (d) Reference to this test method, i.e. AS/NZS 2615, Appendix A.

APPENDIX B
LOSS OF HEIGHT TEST
(Normative)

B1 SCOPE

This Appendix sets out a method for assessing the loss of height of a hydraulic trolley jack under load and for checking that the hydraulic trolley jack can hold the load at a fixed position.

B2 APPARATUS

The following apparatus is required:

- (a) A suitable device (e.g. a hydraulic test rig) calibrated to ensure—
 - (i) a minimum readability of 1 in 40;
 - (ii) a minimum accuracy of $\pm 5\%$;
 - (iii) a minimum repeatability of $\pm 5\%$; andcapable of applying the appropriate force and having a means of indicating the force being applied. Alternatively, a suitable rig which employs a weight of appropriate mass to apply the force may be used.
- (b) A means of measuring perpendicular height of a point above a plane to an accuracy of ± 0.5 mm.
- (c) A suitably large, hard, flat surface such as metal onto which the hydraulic trolley jack is stood and tested.

B3 PROCEDURE

The procedure shall be as follows:

- (a) Set any available means of height adjustment (other than that provided by the normal travel of the hydraulic trolley jack) to its highest position.
- (b) Raise the head cap until it is at the midpoint of its range of travel.
- (c) Apply a force centrally to the head cap equal to 10% of the nominated capacity of the hydraulic trolley jack.
- (d) Measure the original height (H_1) of the head cap above the base plane on which it is standing, in millimetres.
- (e) Increase the force until it is equal to 100% of the nominated capacity of the hydraulic trolley jack.
- (f) Measure the height (H_2) of the head cap above the base plane, in millimetres.
- (g) Maintain the force on the hydraulic trolley jack for a period of 30 minutes; and
- (h) Measure the height (H_3) of the head cap above the base plane, in millimetres.

B4 REPORT

The following shall be reported:

- (a) The loss of height of the head cap expressed as a percentage of the original height of the head cap, calculated from the following equation:

$$\text{Percentage of loss of height} = \frac{(H_1 - H_2) \times 100}{H_1} \quad \dots \text{B1}$$

- (b) The loss of height after 30 minutes, calculated as follows:

$$\text{Loss of height (after 30 minutes)} = H_2 - H_3 \quad \dots \text{B2}$$

- (c) Reference to this test method, i.e. AS/NZS 2615, Appendix B.

APPENDIX C

STOP TEST DURING THE LOWERING OF THE HYDRAULIC TROLLEY JACK

(Normative)

C1 SCOPE

This Appendix sets out a method for determining the extent to which the descent of the head cap of a hydraulic trolley jack can be controlled by the operator. The object of the test is to measure how far the hydraulic trolley jack head cap travels after stopping action has been taken while the hydraulic trolley jack is being lowered under load.

C2 APPARATUS

The following apparatus is required:

- (a) A test mass or an equivalent means of applying an approximately constant force equal to the nominated capacity of the hydraulic trolley jack ($\pm 5\%$), to the head cap as it is being lowered.

Where a test mass is used it shall be constrained so that it can move only in a vertical direction and so that the centre of gravity of the weight remains vertically above the head cap.

- (b) Where a means other than a test mass is employed (e.g. a hydraulic device) it should be capable of measuring and recording the force applied to the head cap and be calibrated to ensure—

- (i) a minimum readability of 1 in 40;
- (ii) a minimum accuracy of $\pm 5\%$; and
- (iii) a minimum repeatability of $\pm 5\%$.

- (c) A means of measuring perpendicular height of a point above a plane to an accuracy of ± 0.5 mm.

C3 REFERENCE MARKS

Means shall be provided for comparison of a reference mark on the head cap of the hydraulic trolley jack with a fixed reference mark either positioned independently of the hydraulic trolley jack or located on a non-moving part of the hydraulic trolley jack itself.

The fixed reference mark shall be located so as to coincide with the mark on the hydraulic trolley jack when the head cap is at the midpoint of its travel.

C4 PROCEDURE

The procedure shall be as follows:

- (a) Measure, the full range of travel (D_1) of the head cap, in millimetres.
- (b) Raise the head cap to its highest position and load the hydraulic trolley jack to its nominated capacity.
- (c) With the load constantly applied, lower the head cap using the handle or other control provided.

- (d) Observe the reference marks and take action to stop the travel of the head cap when the two marks coincide, as described in Paragraph C3.
- (e) Once the head cap has stopped, measure the distance (D_2) between the marks, in millimetres.

C5 REPORT

The following shall be reported:

- (a) The full range of travel (D_1) of the head cap.
- (b) The distance (D_2) between the two reference marks.
- (c) The distance required to stop the head cap as a percentage of the full range of travel of the head cap, which is calculated as follows:

$$\text{Percentage of stopping distance} = \frac{D_2}{D_1} \times 100 \quad \dots C1$$

- (d) Reference to this test method, i.e. AS/NZS 2615, Appendix C.

APPENDIX D OVERLOAD TEST

(Normative)

D1 SCOPE

This Appendix sets out a method for determining whether a hydraulic trolley jack can withstand a load in excess of its nominated capacity.

D2 APPARATUS

The following apparatus is required:

- (a) A suitable device (e.g. a hydraulic test rig) calibrated to ensure—
 - (i) a minimum readability of 1 in 40;
 - (ii) a minimum accuracy of $\pm 5\%$;
 - (iii) a minimum repeatability of $\pm 5\%$; and
 capable of applying the appropriate force and having a means of indicating the force being applied. Alternatively, a suitable rig which employs a weight of appropriate mass to apply the force may be used.
- (b) A means of measuring perpendicular height of a point above a plane to an accuracy of ± 0.5 mm.
- (c) A suitably large, hard, flat surface such as metal, on which the hydraulic trolley jack stands for testing.
- (d) A device which will measure the operating force normal to the handle at the operating position to an accuracy of $\pm 5\%$.

D3 PROCEDURE

The procedure shall be as follows:

- (a) Disable the overload device if it interferes with this test.
- (b) Set any available means of height adjustment (other than that provided by the normal travel of the hydraulic trolley jack) to its highest position.
- (c) Mount the hydraulic trolley jack on a flat, rigid surface.
- (d) Raise the head cap until it is at the midpoint of its range of travel.
- (e) Apply a force to the head cap equal to 10% of the nominated capacity of the hydraulic trolley jack centrally to the head cap.
- (f) Measure the height (H_1) of the head cap above the base plane, in millimetres.
- (g) Apply a force equal to 200% of the nominated capacity of the hydraulic trolley jack centrally to the head cap and maintain for 1 min.
- (h) Reduce the force to 10% of the nominated capacity of the hydraulic trolley jack and measure the height (H_2) of the head cap above the base plane at the same point as used in Step (f), in millimetres.
- (i) Lower the head cap to its minimum height, then perform one lifting cycle at the nominated capacity, measuring the operating force.

D4 REPORT

The following shall be reported:

- (a) Whether or not the hydraulic trolley jack collapsed or become unstable.
- (b) The loss of height of the head cap expressed as a percentage of the original height of the head cap, which is calculated as follows:

$$\text{Percentage of loss of height} = \frac{H_1 - H_2}{H_1} \times 100 \quad \dots \text{D1}$$

- (c) Whether or not it was possible to lower the head cap to its minimum height and perform one lifting cycle using an operating force not greater than 450 N.
- (d) Reference to this test method, i.e. AS/NZS 2615, Appendix D.

APPENDIX E
ECCENTRIC LOAD TEST
(Normative)

E1 SCOPE

This Appendix sets out a method for determining whether a hydraulic trolley jack can withstand an eccentrically applied load in excess of its nominated capacity.

E2 APPARATUS

The following apparatus is required:

- (a) A suitable device (e.g. a hydraulic test rig) calibrated to ensure—
 - (i) a minimum readability of 1 in 40;
 - (ii) a minimum accuracy of $\pm 5\%$;
 - (iii) a minimum repeatability of $\pm 5\%$; and
 capable of applying the appropriate force and having a means of indicating the force being applied. Alternatively, a suitable rig which employs a weight of appropriate mass to apply the force may be used.
- (b) A means of measuring perpendicular height of a point above a plane to an accuracy of ± 0.5 mm.
- (c) A suitably large, hard, flat surface such as metal, on which the hydraulic trolley jack stands for testing.

E3 PROCEDURE

The procedure shall be as follows:

- (a) Disable the overload device if it interferes with this test.
- (b) Set any available means of height adjustment (other than that provided by the normal travel of the hydraulic trolley jack) to its highest position.
- (c) Mount the hydraulic trolley jack on a flat rigid surface.
- (d) Raise the head cap until the top/surface of the lifting arm is horizontal to $\pm 2^\circ$.
- (e) Rotate the head cap in either direction so that the centre of a retaining lug (Point 'Y') is nearest the front axle to the centre-line of the hydraulic trolley jack. (See Figure E1).
- (f) Apply a force to point 'Y' equal to 10% of the nominated capacity of the hydraulic trolley jack.
- (g) Measure the height (H_1) at point 'Y' above the base plane, in millimetres.
- (h) Apply a force equal to 125% of the nominated capacity of the hydraulic trolley jack to one of the locations for point 'Y' as determined in Step (e) and hold for 1 minute.
- (i) Reduce the force to 10% of the nominated capacity of the hydraulic trolley jack and measure the height (H_2) of point 'Y' above the base plane, in millimetres.
- (j) Lower the head cap to its minimum height, then perform one lifting cycle at the nominated capacity and measure the operating force, in newtons.

- (k) Raise the head cap until it is at the midpoint of its range of travel.
- (l) Rotate the head cap in either direction so that the centre of a retaining lug is at $90 \pm 2^\circ$ (Point 'X') to the centre-line of the hydraulic trolley jack (see Figure E1).
- (m) Apply a force to point 'X' equal to 10% of the nominated capacity of the hydraulic trolley jack.
- NOTE: It is intended that this test be conducted on one side or other of the hydraulic trolley jack. It should not be conducted on one side then the other.
- (n) Measure the height (H_3) at point 'X' above the base plane, in millimetres.
- (o) Apply a force equal to 125% of the nominated capacity of the hydraulic trolley jack to one of the locations for point 'X' as determined in Step (e) and hold for 1 minute.
- (p) Reduce the force to 10% of the nominated capacity of the hydraulic trolley jack and measure the height (H_4) of point 'X' above the base plane, in millimetres.
- (q) Lower the head cap to its minimum height, then perform one lifting cycle at the nominated capacity and measure the operating force, in newtons.

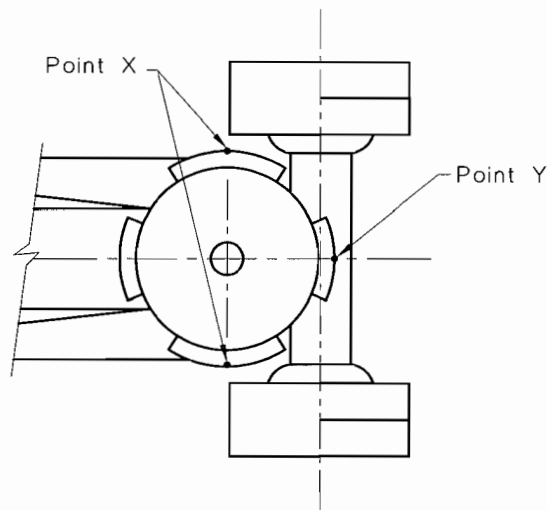


FIGURE E1 ECCENTRIC LOAD TEST—POINT 'X' AND 'Y' AT WHICH TO APPLY FORCE

E4 REPORT

The following shall be reported:

- (a) Whether or not the hydraulic trolley jack collapsed or became unstable.
- (b) The head cap height at which the hydraulic trolley jack was tested.
- (c) The loss of height of the head cap expressed as a percentage of the original height of the head cap, which is calculated as follows:

$$\text{Loss of height at Point 'Y'} = \frac{H_1 - H_2}{H_1} \times 100 \quad \dots \text{E1}$$

$$\text{Loss of height at Point 'X'} = \frac{H_3 - H_4}{H_3} \times 100 \quad \dots \text{E2}$$

- (d) If the head cap rotates freely after the test.
- (e) The operating force recorded in Steps E3(j) and E3(q).
- (f) Reference to this test method, i.e. AS/NZS 2615, Appendix E.

APPENDIX F
ESTABLISHMENT OF CAPACITY
(Normative)

F1 SCOPE

This Appendix sets out a method for determining the load which a hydraulic trolley jack can lift using an operating force on the handle of not more than 450 N. It is normally only required where the handle operating force exceeds 450 N at the nominal capacity.

F2 APPARATUS

The following apparatus is required:

- (a) A suitable device (eg. a hydraulic test rig) calibrated to ensure—
 - (i) A minimum readability of 1 in 40;
 - (ii) A minimum accuracy of $\pm 5\%$;
 - (iii) A minimum repeatability of $\pm 5\%$; and
 capable of applying the appropriate force/mass to the head cap and also to measure the force applied to the hydraulic trolley jack handle.
- (b) A suitably, large, hard, flat surface such as metal, onto which the hydraulic trolley jack is stood and tested.
- (c) A device which will measure the operating force normal to the handle at the operating position to an accuracy of $\pm 5\%$.

F3 PROCEDURE

F3.1 Force measuring device method

The procedure for using a force measuring device with a peak hold facility shall be as follows:

- (a) Disable the overload device if it interferes with this test.
- (b) Mount the hydraulic trolley jack on a flat, rigid surface.
- (c) Position the head cap in its lowest position.
- (d) Apply an operating force of 450 N to the handle and try to lift against the force on the head cap.
- (e) Record the peak head cap force measured.
- (f) Repeat Steps (c) to (e) throughout the lift range of the hydraulic trolley jack.
- (g) Note the lowest peak force recorded.
- (h) Express the head cap force determined in Step (g) in kilograms and round down to the nearest 50 kg.

NOTE: This is the established capacity.

F3.2 Test mass method

The procedure for using a test mass shall be as follows:

- (a) Disable the overload protection device if it interferes with this test.

- (b) Mount the hydraulic trolley jack on a flat, rigid surface.
- (c) Position the head cap in its lowest position.
- (d) Apply a mass lower than the nominated capacity to the head cap.
- (e) Operate the handle and try to lift against the mass on the head cap. Measure the operating force required to commence lifting the mass.
- (f) If the force achieved in Step (e) is higher than 450 N, repeat Steps (d) and (e) using a lower mass applied to the head cap. Repeat this process until an operating force of 450 N is achieved. Record the actual mass used to achieve the operating force of 450 N.
- (g) Complete the lift cycle with the mass used to achieve the force of 450 N in Step (f) on the head cap.
- (h) If the operating force exceeds 450 N at any time during Step (g), repeat Step (f) at the point/s where the operating force exceeds 450 N. Record the mass required to achieve the operating force of 450 N.
- (i) If the force is achieved in Step (e) is lower than 450 N, repeat Steps (d) and (e) using a higher mass applied to the head cap. Repeat this process until an operating force of 450 N is achieved.

NOTE: Do not exceed the nominated capacity of the hydraulic trolley jack.

- (j) Round down the lowest mass required to achieve 450 N during these steps above to the nearest 50 kg.

NOTE: This is the 'established capacity'.

F4 REPORT

The following shall be reported:

- (a) The 'established capacity' as determined in Paragraph F3, which the hydraulic trolley jack was capable of lifting using an operating force of not more than 450 N
- (b) Whether a force measuring device or a test mass was used.
- (c) Reference to this test method, i.e. AS/NZS 2615, Appendix F.

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